

Expenditures for Medicaid Patients Treated With Exenatide Compared With Other Diabetes Management Regimens

Jennie H. Best, PhD; John A. Romley, PhD; Dana P. Goldman, PhD;
Ryan M. Conrad, PhD; and Anne L. Peters, MD

In 2010, more than 34 million adults were enrolled in Medicaid; it has been estimated that 11.3% of American adults have diabetes.^{1,2} In 2007, total annual US direct medical spending for diabetes was estimated to exceed \$116 billion.² Annualized, this translates to adjusted mean medical expenditures of \$11,744 for patients with diabetes, compared with \$5095 for those without diabetes.³ The Congressional Budget Office projects adult Medicaid enrollment to exceed 43 million people in 2014, and more than 55 million people in 2020.¹

Clinical guidelines recommend that patients with newly diagnosed type 2 diabetes mellitus (T2DM) receive initial treatment with metformin unless contraindicated. The addition of other therapies is recommended if target glycated hemoglobin (A1C) levels are not reached. As diabetes is a progressive disease, most patients eventually require combination therapy to maintain A1C goals, although guidelines do not stipulate a clear therapeutic preference vis-à-vis glycemic control.⁴ While comparative effectiveness research studies have addressed clinical outcomes more broadly, it is not fully understood which therapeutic combinations are associated with lower total costs.^{5,6}

The availability of antidiabetic medications for patients on Medicaid varies from state to state, and formulary restrictions often limit use of drugs. Many drugs have limitations for use in various settings due to restricted Medicaid formulary coverage. The use of pioglitazone, insulin analogues, and newer antidiabetic medications recently approved by the US Food and Drug Administration (FDA) (glucagon-like-peptide-1 [GLP-1] receptor agonists and dipeptidyl peptidase-4-inhibitors [DPP4Is]) is limited to varying degrees based on state and local policies. In the case of exenatide, a GLP-1 receptor agonist, Medicaid boards in several states approved its use soon after FDA approval. For example, in 2005, exenatide was placed on the preferred drug list in West Virginia and Iowa.^{7,8} However, Medicaid boards in other states have delayed the inclusion of exenatide in their formularies.^{9,10} In contrast, glucose-lowering agents that have been on the market longer, such as metformin and sulfonylureas (SUs), are widely available and covered by Medicaid preferred drug lists.⁷⁻¹⁴ Antidiabetic therapies differ in their costs, with 30-day average wholesale prices in this study population ranging from \$236 for DPP4Is to \$513 for exenatide (2011 dollars).

Abstract

Objective: To compare Medicaid spending among patients with type 2 diabetes mellitus (T2DM) receiving exenatide or other add-on therapies.

Study Design: Medicaid data in patients with T2DM were compared among those who initiated exenatide, thiazolidinediones, dipeptidyl peptidase-4 inhibitors, or basal insulin. Patients were on a regimen of metformin and/or sulfonylurea for 30 days and continued the next-line therapy for at least 90 days.

Methods: Total inpatient, outpatient, prescription, and total annual health expenditures were compared for 1 year following treatment initiation. Regression analyses were conducted to compare spending; analyses controlled for patient characteristics, year of initiation, and prior therapy. Propensity score matching was used to match patients receiving exenatide with those receiving other therapies, and analyses were repeated with matched cohorts.

Results: Of 23,966 eligible patients, 1345 initiated exenatide and 22,621 initiated other therapies. In the unmatched analysis, medical spending was significantly lower in those given exenatide compared with those given other therapies for inpatient (\$1945 vs \$3893), prescription (\$4505 vs \$5714), and total costs (\$11,830 vs \$15,459) ($P < .01$ for all); outpatient spending was not significantly different (\$5380 vs \$5853, $P = .15$). In the matched analysis ($n = 1345$ for exenatide, $n = 1345$ non-exenatide), patients receiving exenatide had significantly lower spending in all 4 categories: inpatient (\$1945 vs \$4242), outpatient (\$5380 vs \$6826), prescription (\$4505 vs \$5878), and total (\$11,830 vs \$16,945) ($P < .01$ for all).

Conclusion: Patients with T2DM receiving exenatide had lower annual Medicaid claims costs compared with patients receiving other therapies.

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For author information and disclosures, see end of text.

Report

To address the value of adding exenatide to the treatment regimen of patients on existing therapy consisting of metformin and/or SUs, this study compared Medicaid-enrolled patients with T2DM who had exenatide added to their therapeutic regimen with those who had thiazolidinediones (TZDs), basal insulin, or DPP4Is added. Four spending outcomes—inpatient, outpatient, prescription, and total—were measured for the year following initiation of each of these treatments. Regression analyses were conducted to control for patient characteristics. All comparisons with patients given exenatide were performed with the entire study cohort and again with propensity score–matched groups.

Methods

Study Sample

This retrospective cohort analysis applied Medicaid claims data from January 1, 2005, to December 31, 2009, from the Thomson Reuters MarketScan Multi-State Medicaid Database. This database contains inpatient, outpatient, and pharmacy claims of approximately 880,000 Medicaid enrollees with multiple claims with diabetes diagnoses. Also included in this database are demographic information, diagnosis codes, costs, dates of occurrence, and other administrative information. Clinical information, however, such as body mass index, blood pressure measurements, and laboratory results, such as A1C values, are not available. This database contained Medicaid claims information from 12 geographically dispersed states; however, state-level information or identifiers for geographic location were not available.¹⁵

Patients between 18 and 65 years of age were eligible for the study if they had T2DM, confirmed by 2 diagnoses of T2DM (*International Classification of Diseases, 9th Revision, Clinical Modification* codes 250.x0 or 250.x2) at least 30 days apart, or at least 1 T2DM diagnosis and a filled prescription for a 30-day supply of antidiabetic medication. These requirements helped to ensure the stability and accuracy of the diabetes diagnosis. Patients were required to have received an SU and/or metformin for at least 30 days, followed by the addition of exenatide, a TZD, basal insulin (long-acting or intermediate-acting, including detemir, glargine, and neutral protamine Hagedorn), or a DPP4I for at least 90 days within 12 months of initiating these add-on therapies. Patients who received treatment with more than 1 of the 4 specified add-on therapies during the study period were excluded. Those who used rapid-acting insulin prior to, or in combination with, the addition of a new therapy were excluded.

The index date was defined as the first date of add-on therapy initiation. For study inclusion, patient data had to

be available for 12 consecutive months prior to the index date (ie, pre-period) and 12 consecutive months after the index date (ie, follow-up period). The pre-period served as a washout to ensure that the study captured new T2DM treatment initiation. Data obtained during the pre-period also enabled identification of comorbidities and calculation of the Charlson Comorbidity Index (CCI). The 12-month follow-up period allowed for an adequate observation window for outcomes.

Outcomes

Spending outcomes were evaluated for the 365 days subsequent to add-on treatment initiation. Outcomes were inpatient, outpatient, and pharmacy claims, and total spending (consisting of these 3 cost components). Costs were converted to 2011 US dollars based on the medical care component of the Consumer Price Index.³

Study Design

Two potential confounders that could affect study outcomes were identified prospectively. First, physicians make treatment decisions based on a variety of factors, some of which cannot be fully observed in claims data (eg, comorbid disease severity, treatment adherence likelihood, and formulary restrictions).¹⁶⁻¹⁸ In addition, patient preferences and other factors can influence treatment initiation. These unobserved factors could confound the effect of therapy on measured outcomes.^{16,19,20}

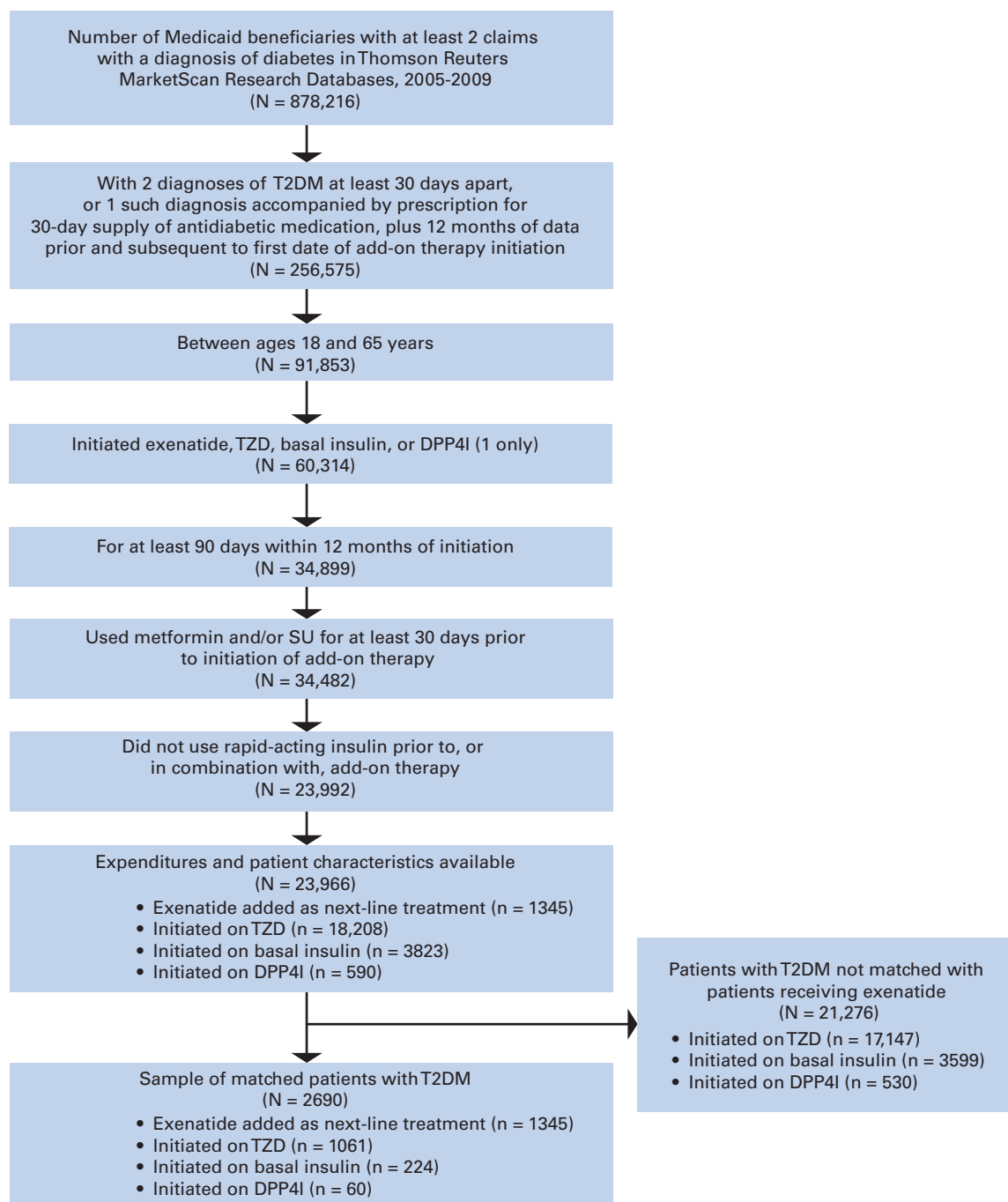
To address measured potential confounders, propensity score matching was used to match patients who were given exenatide with patients using 1 of the other 3 therapies (TZD, basal insulin, or DPP4I). Matching was based on patient age, gender, race, pre-period CCI, comorbidities (including congestive heart failure [CHF], hyperlipidemia, hypertension, stroke, chronic obstructive pulmonary disease [COPD], and end-stage renal disease [ESRD]), year of treatment initiation, and prior therapy (ie, an SU and/or metformin used in the 90 days prior to initiation). Predicted probabilities from a multivariate logistic regression analysis of exenatide use were used to identify and match the “nearest neighbor” who received exenatide to each patient who did not.

Statistical Analyses

Baseline characteristics, including demographics (age, race, sex), CCI, comorbidities (from CCI), prior diabetes therapy, and year of treatment initiation, were compared among patients who received exenatide and those who did not.

Mean medical spending in patients receiving exenatide was compared with that in patients receiving other add-on

■ **Figure 1.** Definition of Analysis Sample



DPP4I indicates dipeptidyl peptidase-4 inhibitor; SU, sulfonylurea; T2DM, type 2 diabetes mellitus; TZD, thiazolidinedione.

therapies. Additionally, results in patients not receiving exenatide were analyzed by individual treatment groups (ie, TZD, basal insulin, and DPP4I). Analyses were first completed using all patients who did not receive exenatide, then limited to the propensity score–matched sample.

Regression-adjusted models controlled for patient characteristics including age, sex, race, comorbidities (CHF, hypertension, stroke, COPD, hyperlipidemia, and ESRD), CCI, year of drug initiation, and prior therapy. With a large sample, linear regression should not be biased. The results are

■ **Table 1.** Baseline Characteristics of Patients Initiating Exenatide or Non-Exenatide Therapy (TZD, basal insulin, or DPP4I), % Unless Otherwise Noted

	Exenatide (n = 1345)	Non-Exenatide (n = 22,621)	Non-Exenatide by Individual Therapy		
			TZD (n = 18,208)	Basal Insulin (n = 3823)	DPP4I (n = 590)
Demographics					
Age (years)	47.88	51.50 ^a	51.42 ^a	52.09 ^a	50.23 ^a
Sex, female	78.51	65.63 ^a	65.61 ^a	65.37 ^a	67.80 ^a
Race					
White	68.33	50.62 ^a	52.54 ^a	42.24 ^a	45.42 ^a
Black	20.30	32.20 ^a	29.79 ^a	44.49 ^a	26.78 ^a
Hispanic	0.97	1.24	1.32	0.89	1.02
Other	10.41	15.95 ^a	16.34 ^a	12.37	26.78 ^a
Comorbidities					
CCI (score)	1.97	1.52 ^a	1.46 ^a	1.74 ^a	2.04
Hypertension	48.62	44.68 ^a	43.52 ^a	45.83	72.71 ^a
Hyperlipidemia	32.79	24.37 ^a	24.66 ^a	18.81 ^a	51.53 ^a
COPD	22.75	16.84 ^a	16.17 ^a	18.44 ^a	27.29 ^a
CHF	6.62	6.08	4.76 ^a	11.40 ^a	12.37 ^a
Stroke	2.38	2.60	2.34	3.56 ^a	4.41
ESRD	0.30	0.90 ^a	0.65	1.83 ^a	2.37 ^a
Prior therapies					
SU	58.08	67.93 ^a	68.39 ^a	66.15 ^a	65.25 ^a
Metformin	58.37	62.71 ^a	63.29 ^a	60.42	59.49 ^a
Both SU and metformin	30.66	38.91 ^a	40.10 ^a	33.17	39.49 ^a
Physician was ever a prescriber of exenatide					
	100	57.79 ^a	57.64 ^a	56.08 ^a	73.22 ^a

CCI indicates Charlson Comorbidity Index; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; DPP4I, dipeptidyl peptidase-4 inhibitor; ESRD, end-stage renal disease; SU, sulfonylurea; TZD, thiazolidinedione.
^aIndicates value is statistically different ($P < .05$) compared with exenatide group value.

presented as regression-adjusted mean outcomes.²¹ Analyses were conducted using Stata version 11.1 software; results with a P value less than .05 based on 2-tailed t tests were considered significant.

Results

A total of 23,966 patients met the criteria defining the population of interest. Of these, 1345 had exenatide added as a next-line treatment. Patients who did not receive exenatide ($n = 22,621$) were predominantly initiated on TZDs ($n = 18,208$), followed by basal insulin ($n = 3823$) or DPP4Is ($n = 590$). **Figure 1** shows how the analysis sample was determined as the inclusion and exclusion criteria were applied.

Once matched, data were included for 1345 patients who received exenatide, and 1345 patients who received a TZD ($n = 1061$), basal insulin ($n = 224$), or DPP4I ($n = 60$), for a

total sample size of 2690. Matched results including baseline characteristics, unadjusted outcomes, and adjusted mean outcomes were consistent with the unmatched results. Only unmatched results are presented below (matched results are presented in the **Appendix**).

Baseline Characteristics

Baseline characteristics of the study populations are shown in **Table 1**. Results in patients not receiving exenatide are also reported by individual therapy (eg, TZD, basal insulin, and DPP4I). Compared with patients who initiated another therapy ($n = 22,621$), those who initiated exenatide therapy ($n = 1345$) were a mean of 3.6 years younger (51.5 vs 47.9 years, respectively; $P < .01$). The exenatide group had a higher proportion of female patients compared with the non-exenatide group (79% vs 66%, respectively; $P < .01$). There were

■ **Table 2.** Unadjusted Spending Outcomes in the Year Following Initiation of Exenatide or Non-Exenatide Therapies (TZD, basal insulin, or DPP4I)

Spending Outcomes	Exenatide (n = 1345)	Non-Exenatide (n = 22,621)	Non-Exenatide by Individual Therapy		
			TZD (n = 18,208)	Basal Insulin (n = 3823)	DPP4I (n = 590)
Inpatient	\$1945	\$3893 ^a	\$3310 ^a	\$6942 ^a	\$2118
Outpatient	\$5380	\$5853	\$5716	\$6489 ^a	\$5957
Prescription	\$4505	\$5714 ^a	\$5753 ^a	\$5776 ^a	\$4111
Total	\$11,830	\$15,459^a	\$14,779^a	\$19,207^a	\$12,187

DPP4I indicates dipeptidyl peptidase-4-inhibitor; TZD, thiazolidinedione.
^aIndicates value is statistically different ($P < .05$) compared with exenatide group value.

also differences in the racial composition of the 2 groups; 68% of patients receiving exenatide were white, compared with 51% of patients receiving other therapy ($P < .01$).

The exenatide group had a mean CCI score of 2.0, while the non-exenatide group had a mean score of 1.5 ($P < .01$). Generally, patients receiving exenatide were significantly more likely than those receiving other treatments to have comorbid conditions: hypertension (49% vs 45%), hyperlipidemia (33% vs 24%), and COPD (23% vs 17%) ($P < .01$ for all). However, compared with patients receiving other therapies, fewer patients receiving exenatide had ESRD (0.9% vs 0.3%, respectively, $P < .01$).

The baseline analysis also examined prescribing patterns of patients' physicians. A significantly lower percentage of patients receiving exenatide were given an SU and/or metformin compared with those not receiving exenatide (SU, 58% vs 68%, respectively; metformin, 58% vs 63%; SU and metformin, 31% vs 39%; $P < .05$ for all). Of the 22,621 patients in the non-exenatide group, 58% visited physicians who had prescribed exenatide for any of their Medicaid patients (42% visited physicians who had never prescribed exenatide).

Unadjusted Outcomes

As shown in [Table 2](#), patients receiving exenatide averaged \$11,830 (standard deviation [SD] = \$15,986) in total annual healthcare expenditures, with a median of \$7082 (data not shown). In comparison, patients receiving other add-on therapies averaged \$15,459 (SD = \$26,012) ($P < .01$). Compared with the non-exenatide group, the exenatide group had lower inpatient costs (\$3893 vs \$1945, $P < .01$) and prescription costs (\$5714 vs \$4505, $P < .01$); outpatient costs were not significantly different (\$5853 vs \$5380). Focusing on specific therapies, the TZD and basal insulin groups had higher expenditures than the exenatide group. For example, total annual healthcare spending aver-

aged \$14,779 among those receiving a TZD compared with \$11,830 for those receiving exenatide ($P < .01$).

Differences in utilization were more muted. Mean total days supplied within a year of initiation of therapy were not significantly different in the exenatide, DPP4I, and basal insulin groups (233.2 days, 235.9 days, and 229.1 days, respectively). Mean TZD use was higher (249.0 days, $P < .01$ vs exenatide).

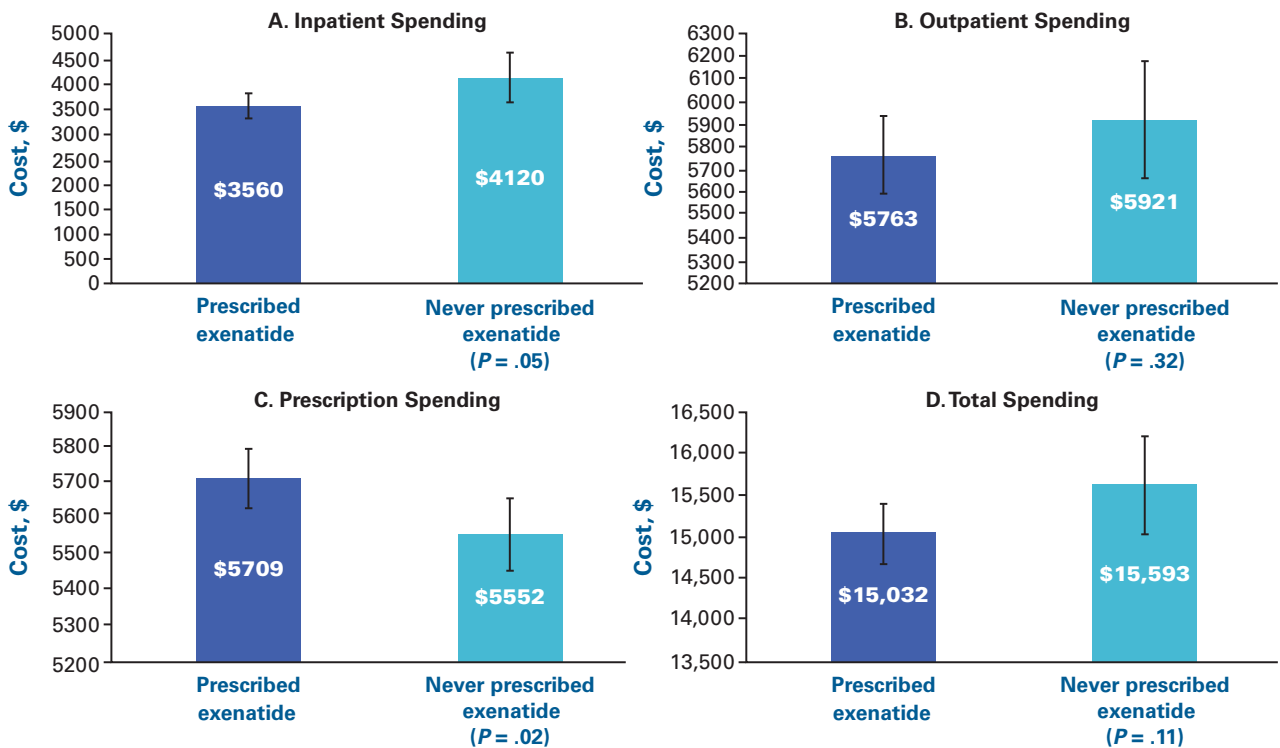
Regression-Adjusted Results

The results reported here correspond to the full sample; results for the propensity-score matched sample were similar, and are reported in the Appendix.

Regression-adjusted mean medical spending in all patients who met the inclusion criteria ($n = 23,966$) is shown by physician prescribing status for exenatide in [Figure 2](#). After adjusting for covariates, inpatient claims for patients of physicians who prescribed exenatide were \$560 less per year than those for patients of physicians who prescribed other therapies ($P = .05$) ([Figure 2A](#)). Compared with patients whose physicians prescribed other add-on therapies, those with physicians that prescribed exenatide had lower outpatient spending (\$158 less) and lower total spending (\$561 less), although these differences were not significant ([Figures 2B and 2D](#)). However, adjusted prescription medication spending for patients of physicians who prescribed exenatide was significantly greater (\$157 more [2.7% higher]) than that for patients of physicians who prescribed other therapies ($P = .02$) ([Figure 2C](#)).

Compared with patients receiving other add-on therapies, Medicaid programs paid lower claims for patients receiving exenatide across all spending categories. After adjusting for covariates, inpatient spending for patients given exenatide was \$1939 ($P < .01$) less than that for patients given other therapies. Similarly, adjusted outpatient spending was \$478 less per year with exenatide ($P = .08$); this difference represented an 8.2% reduction in outpatient costs compared with

Figure 2. Spending Outcomes in Patients of Physicians Who Prescribe Exenatide Compared With Patients Whose Physicians Never Prescribed Exenatide



Values of adjusted means are shown in the center of each bar. Standard error bars are shown. *P* values are in comparison with the exenatide group. *N* = 23,966 patients (14,417 patients of physicians who prescribed exenatide and 9549 patients of physicians who never prescribed exenatide). Regression controls for patient characteristics: age, sex, race, comorbidities, prior therapy, and year of treatment initiation.

other therapies. Adjusted prescription medication spending and total spending were also significantly lower with exenatide compared with other add-on therapies (\$397 less, $P = .02$; \$2814 less, $P < .01$, respectively). **Figure 3** shows spending based on adjusted data and according to the specific add-on therapy that patients received. Spending outcomes for patients given exenatide were less than those for patients using other therapies. Regression analysis showed that outpatient spending in patients receiving exenatide was \$390 less ($P = .16$) than for patients receiving a TZD, \$660 less ($P = .04$) than for patients receiving basal insulin, and \$1056 less ($P = .045$) than for patients receiving a DPP4I (Figure 3B). Prescription medication spending with exenatide was \$347 less than for a TZD ($P = .04$), \$499 less than for basal insulin ($P < .01$) (Figure 3C), and \$733 less than for a DPP4I ($P < .01$). Total spending in patients receiving exenatide was \$2303 less than for those receiving a TZD ($P < .01$), \$5317 less than for those receiving basal insulin ($P < .01$), and \$2540 less than for those receiving a DPP4I ($P < .01$) (Figure 3D).

Discussion

Drug expenditures were significantly higher, while inpa-

tient spending was significantly lower, for Medicaid patients with T2DM whose physicians prescribed exenatide at least once during 2005 to 2009. Compared with other add-on therapies, patients given exenatide had significantly lower inpatient, outpatient, prescription medication, and total spending.

Together, these results suggest that patients on Medicaid who are cared for by physicians with the flexibility to prescribe exenatide had lower healthcare spending than those who are cared for by physicians who never prescribed exenatide. These findings add to some recent evidence that exenatide is associated with lower healthcare costs than other T2DM therapies (these earlier studies also found that exenatide was not associated with poor clinical outcomes).²²⁻²⁴

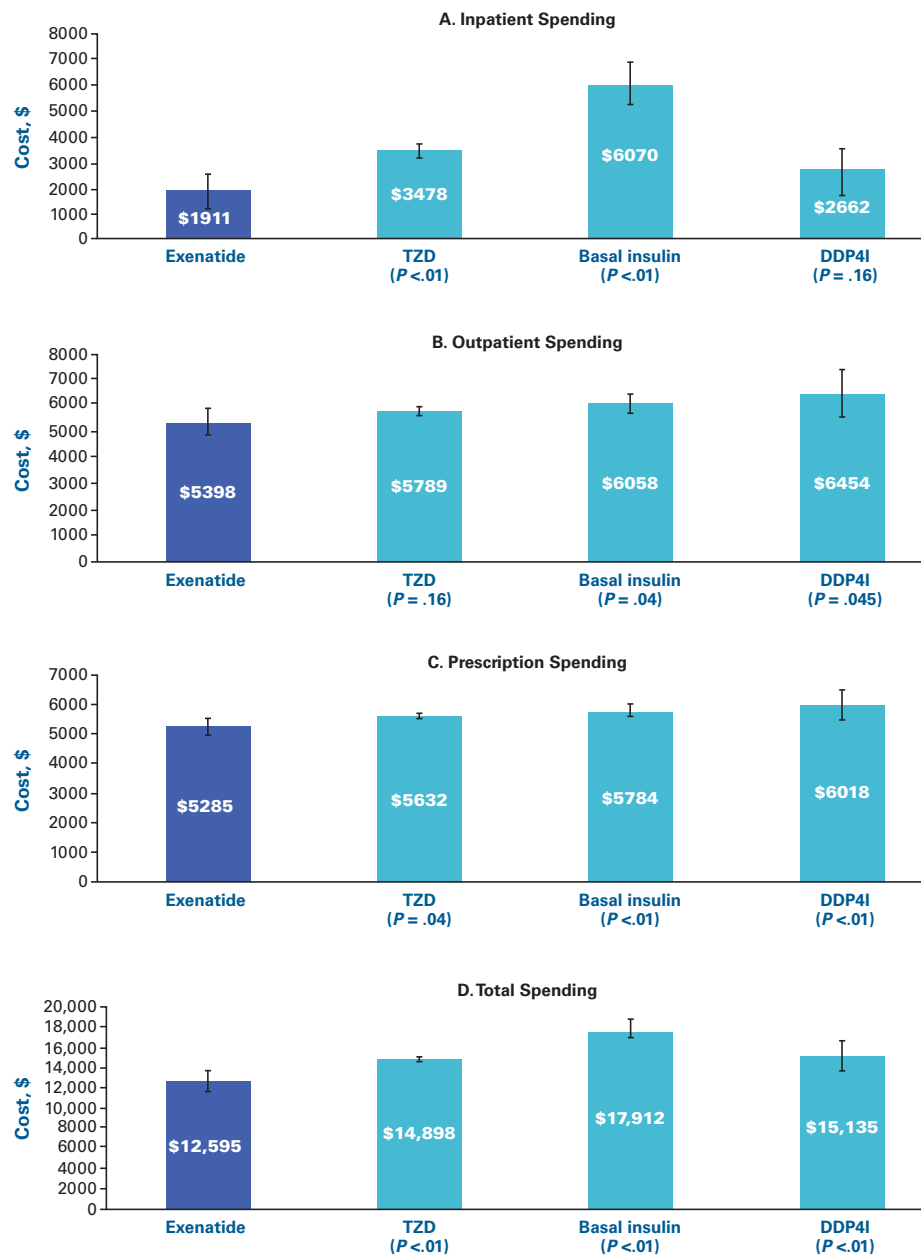
There are several limitations to this study. One limitation was that the data did not contain any state identifiers. Since Medicaid policies vary from state to state,²⁵ similar patients who live in different states will have varying levels of access to antidiabetic medications. This difference could lead to biased results if left uncontrolled. To address this concern, each physician in the data set was identified as to whether or not they have prescribed exenatide to patients. Each patient

was categorized as having a physician who prescribed or never prescribed exenatide.

Because insulin is generally initiated later in the progression of T2DM compared with other therapies, patients receiving insulin may have poorer health outcomes and other comorbidities, and thus higher medical costs, compared with those receiving other treatments.^{16,19,26} Certain unobservable factors may account for some of the differences in outcomes observed between exenatide and insulin. Therefore, to better understand the outcomes in patients initiating various treatments, an analysis was performed that stratified patients by specific treatment received. In all categories of medical spending, costs were lower in those given exenatide compared with those given insulin.

Likewise, any study approach that directly compares outcomes between insulin and non-insulin therapies may be biased. This is because patient and physician resistance to insulin initiation is well documented, and can be predicated on concerns about weight gain, hypoglycemia, patient adherence, or regimen complexity.^{16,19,26} For these reasons, insulin may not be prescribed until other treatments fail, resulting in a group of patients that have T2DM of longer duration. To mitigate these unobserved differences, propensity scores were used in this study to create a matched sample. Propensity score matching on characteristics likely to be correlated with these unobservable differences, such as the presence of comorbidities, can help reduce potential biases.²⁷ Finally, it is important to note that these models may not necessarily measure how

Figure 3. Spending Outcomes in Patient Receiving Exenatide, a TZD, Basal Insulin, or a DPP4I



DPP4I indicates dipeptidyl peptidase-4 inhibitor; TZD, thiazolidinedione. Values of adjusted means are shown in the center of each bar. Standard error bars are shown. P values are in comparison with the exenatide group. N = 23,966 patients (1345 receiving exenatide, 18,208 a TZD, 3823 basal insulin, and 590 a DPP4I). Regression controls for patient characteristics: age, sex, race, comorbidities, prior therapy, and year of treatment initiation.

the specific type of medication produces differences in outcomes.

Another study limitation was that the DPP4I group had the fewest patients from the overall sample (n = 590), and once the propensity score–matched groups were established,

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this small size was amplified ($n = 60$). Given the small sample size, results in those given DPP4Is are more likely to have been skewed by outliers (eg, a few patients with very high medical spending due to medication or procedures) and may be less reliable. Results in this group should be validated in larger studies if future investigators are interested in tracking the costs associated with these specific drugs.

Conclusion

The current data suggest that patients given exenatide had reduced costs compared with those given a TZD, basal insulin, or a DPP4I. Additionally, these results indicated that patients who are cared for by exenatide prescribers experienced lower spending outcomes. Medicaid policies that provide exenatide coverage may result in fewer inpatient, outpatient, and prescription claims, and lower total medical spending. These results also suggest that patients who visit physicians who use a wide array of diabetes treatments may be more likely to be given the treatment that is best suited to maintain their health.

Comparative effectiveness research continues to build interest around the efficacy, safety, and value of existing and new T2DM therapies. As further evidence is generated, the role of these medications in clinical guidelines and algorithms for diabetes management is being reassessed. The long-term clinical efficacy and safety profile of exenatide has been established in a series of successful clinical trials.²⁸⁻³⁰ The current analysis indicates that there is also potential economic value in positioning exenatide as a preferred second-line therapy.

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Author affiliations: Amylin Pharmaceuticals, Inc, San Diego, California (JHB); Precision Health Economics, LLC, Los Angeles, California (RMC); Price School of Public Policy and Leonard D. Schaeffer Center for Health Policy and Economics, University of Southern California, Los Angeles, CA (DPG); Division of Endocrinology, Keck School of Medicine and Clinical Diabetes Program, University of Southern California, Los Angeles, CA (ALP); Price School of Public Policy, University of Southern California, Los Angeles, CA (JAR).

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Address correspondence to: Jennie H. Best, PhD, Amylin Pharmaceuticals, Inc, 9360 Towne Centre Dr, San Diego, CA 92121. E-mail: jennie.best@amylin.com.

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Appendix

Table 1A. Baseline Characteristics of Patients Initiating Exenatide or Non-Exenatide (TZD, basal insulin, or DPP4I) Therapies, % Unless Otherwise Noted

	Exenatide (n = 1345)	Non-Exenatide (n = 1345)	Non-Exenatide by Individual Therapy		
			TZD (n = 1061)	Basal Insulin (n = 224)	DPP4I (n = 60)
Demographics					
Age (years)	47.90	48.03	48.12	48.03	46.33
Sex, female	78.51	79.48	78.98	79.46	88.33
Race					
White	68.32	68.48	70.97	57.14 ^a	66.67
Black	20.30	20.22	18.10	31.25 ^a	16.67
Hispanic	0.97	1.04	1.13	0.89	0
Other	10.41	10.26	9.80	10.71	16.67
Comorbidities					
CCI (score)	1.97	1.96	1.86 ^a	2.39 ^a	2.02
Hypertension	48.62	52.04	49.67	58.48 ^a	70.00 ^a
Hyperlipidemia	32.79	33.90	33.27	30.80	56.67 ^a
COPD	22.75	23.36	22.62	23.21	36.67 ^a
CHF	6.62	6.10	5.09 ^a	10.27 ^a	8.33
Stroke	2.38	2.38	2.07	3.13	5.00
ESRD	0.30	0.15	0.19	0	0
Prior therapies					
SU	57.84	57.92	57.68	61.16	50.00
Metformin	58.00	58.29	59.28	54.46	55.00
Both SU and metformin	34.20	33.38	34.12	30.80	30.00
Physician was ever a prescriber of exenatide	100	65.58	63.52 ^a	70.54 ^a	83.33 ^a

CCI indicates Charlson Comorbidity Index; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; DPP4I, dipeptidyl peptidase-4-inhibitor; ESRD, end-stage renal disease; SU, sulfonylurea; TZD, thiazolidinedione.
^aIndicates value is statistically different ($P < .05$) compared with exenatide group.

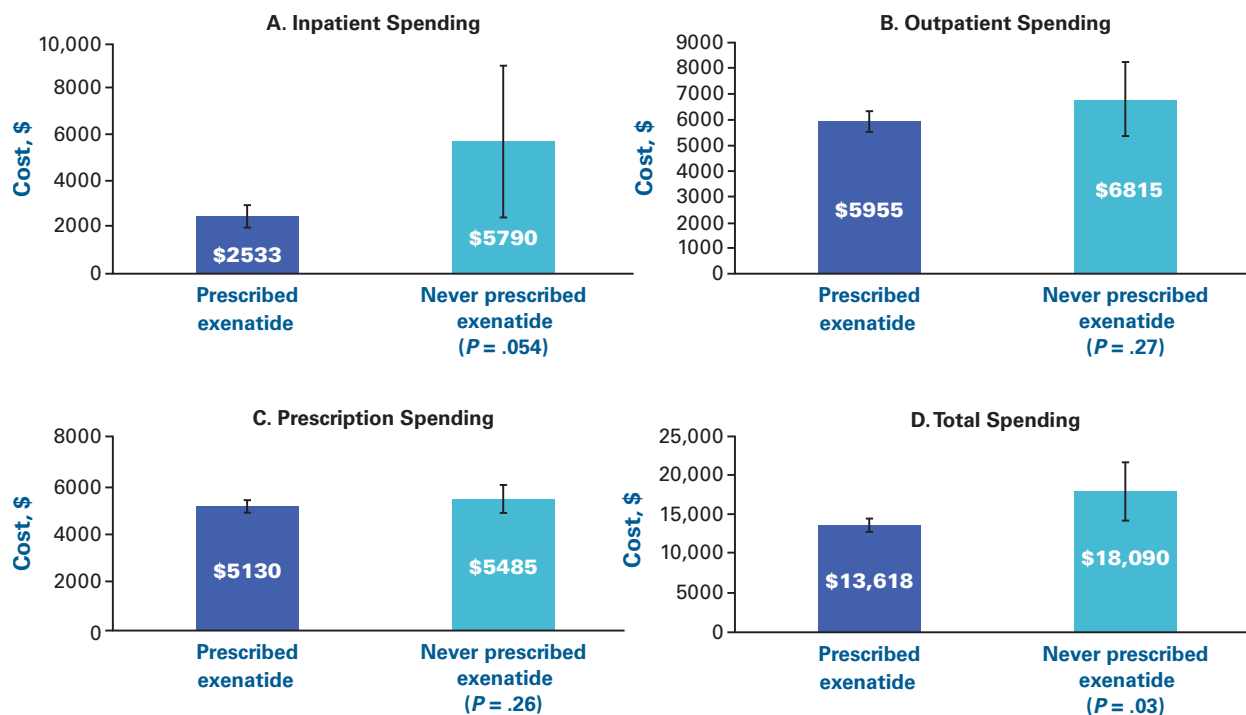
Table 2A. Unadjusted Spending Outcomes in the Year Following Initiation of Exenatide or Non-Exenatide Therapies (TZD, basal insulin, or DPP4I)

Spending Outcomes	Exenatide (n = 1345)	Non-Exenatide (n = 1345)	Non-Exenatide by Individual Therapy		
			TZD (n = 1061)	Basal Insulin (n = 224)	DPP4I (n = 60)
Inpatient	\$1945.35	\$4241.61 ^a	\$3236.85 ^a	\$9870.88 ^a	\$993.29
Outpatient	\$5379.72	\$6826.19 ^a	\$6896.64 ^a	\$6764.65 ^a	\$5810.10
Prescription	\$4504.87	\$5877.63 ^a	\$5856.31 ^a	\$6196.32 ^a	\$5062.91
Total	\$11,829.94	\$16,945.43^a	\$15,989.80^a	\$22,831.85^a	\$11,868.31

DPP4I indicates dipeptidyl peptidase-4 inhibitor; TZD, thiazolidinedione.

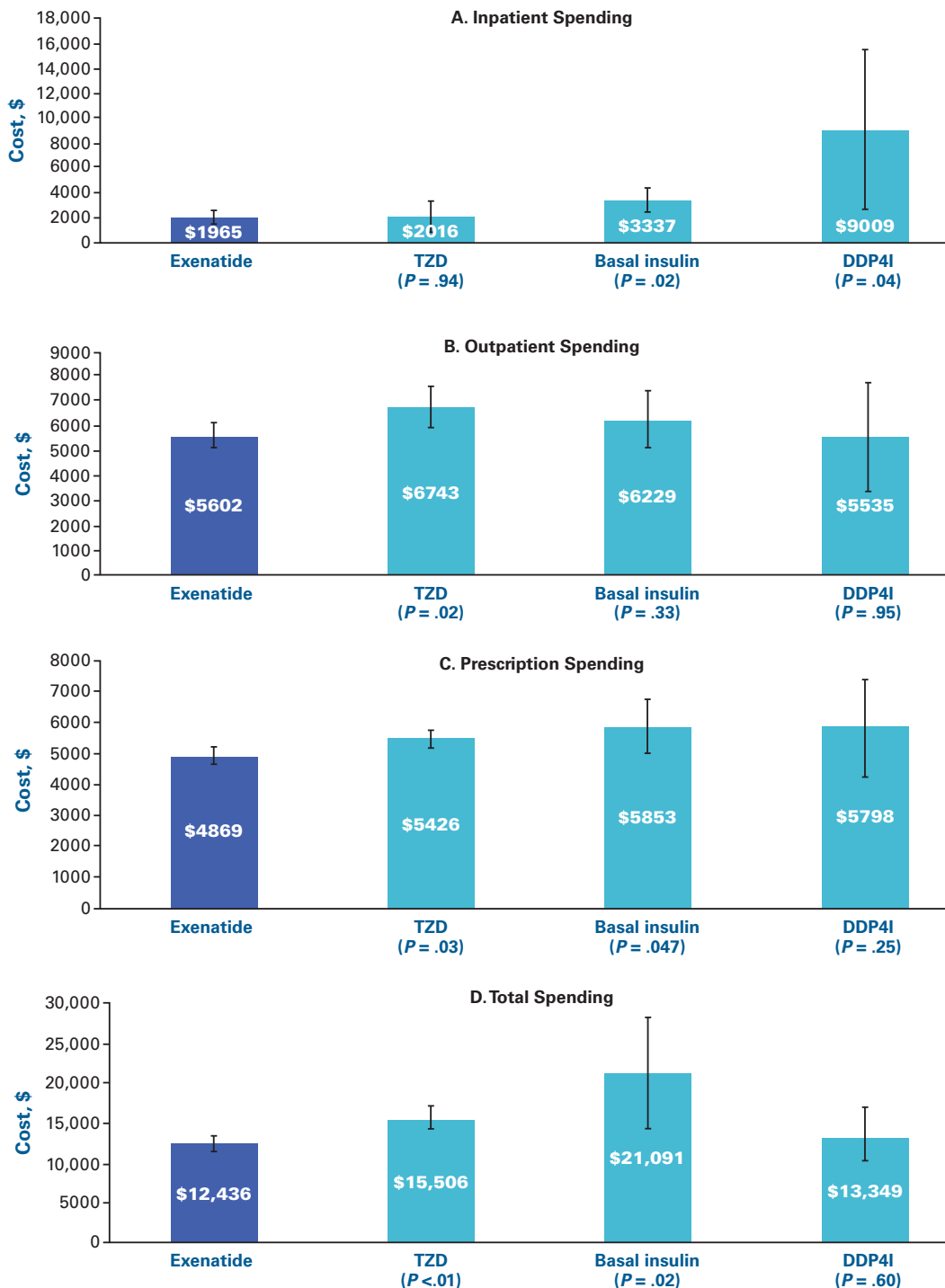
^aIndicates value is statistically different ($P < .05$) compared with exenatide group value.

■ **Figure 1A.** Regression-Adjusted Spending Outcomes in Patients of Physicians Who Prescribe Exenatide Compared With Patients Whose Physicians Never Prescribed Exenatide



Values of adjusted means are shown in the center of each bar. Standard error bars are shown. *P* values are in comparison to the exenatide group. *N* = 2656 patients (1328 patients of exenatide prescribers and 1328 patients of exenatide non-prescribers). Controls for patient characteristics: age, sex, race, comorbidities, prior therapy, and year of treatment initiation.

Figure 2A. Regression-Adjusted Spending Outcomes in Patients Receiving Exenatide, a TZD, Basal Insulin, or a DPP4I



DPP4I indicates dipeptidyl peptidase-4-inhibitor; TZD, thiazolidinedione. Values of adjusted means are shown in the center of each bar. Standard error bars are shown. P values are in comparison to the exenatide group. N = 2656 patients (1328 receiving exenatide, 1046 a TZD, 227 receiving basal insulin, and 55 a DPP4I). Controls for patient characteristics: age, sex, race, comorbidities, prior therapy, and year of treatment initiation.

