Trends in Total and Out-of-pocket Payments for Insulin Among Privately Insured U.S. Adults With Diabetes From 2005 to 2018

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More than 30 million people in the U.S. have diabetes, and approximately 7.4 million (30% of those with diabetes) regularly use one or more insulin formulations. For those who rely on it, i.e., all patients with type 1 diabetes and many patients with type 2 diabetes, insulin is a lifesaving medication. Between 2007 and 2016, the average annual total Medicare Part D payment on insulin per person increased by 358%, which resulted in an 81% increase for the out-of-pocket (OOP) payment (1). The consequences of unaffordability for insulin can be severe and costly. High OOP payments may force individuals to choose between purchasing their medication and paying for other necessities. To date, there are limited data on how total insulin payment and the corresponding OOP payment changed in the commercially insured population within the same period. The objective of this study is to delineate total and patients' OOP payment trends for insulin among privately insured U.S. adults.

We analyzed the IBM MarketScan Commercial Claims and Encounters (CCE) database for the period 2005 to 2018. The CCE contains de-identified patient claims data across the continuum of care (e.g., inpatient, outpatient, pharmacy) from large employers and health plans in the U.S. that provide private insurance coverage for their employees, dependents, and retirees. The primary analytical unit is the insulin prescription of adult individuals with diabetes covered by fee-for-service plans. We defined diabetes by either one inpatient diagnosis or two outpatient diagnoses that occurred at least 30 days apart using ICD-9, Clinical Modification (ICD-9-CM), and ICD-10-CM codes. Insulin prescriptions were extracted using the National Drug Code and categorized into three groups: rapid-acting, regular (including U-500), and short-acting insulin (bolus insulin, including the types glulisine, lispro, aspart, and regular insulin); intermediate-, long-, and ultra-long-acting insulin (basal insulin, including the types NPH insulin, detemir, glargine 100 units/mL (U-100), glargine U-300, and degludec); and premixed insulins (including the types lispro 25/75, lispro 50/50, aspart 30/70, and regular/NPH). The total payment used in this study was defined as the amount the pharmacy received. The OOP payment was defined as the sum of deductible, copay, and coinsurance the patient paid. We standardized the insulin payment for each claim to the payment for an annual supply of the corresponding insulin product based on the number of days covered by the claim. For this, payments were aggregated at an insulin type level, using the respective market share of those types as the analytical weights. We then calculated the relative change (i.e., the change in %) and absolute change (i.e., the amount of increase in $) in payment between 2005 (or year of market introduction) and 2018 by insulin type and group. We plotted monthly payments against time using a 5-month moving average and spline technique (Fig. 1). Payments were standardized to 2018 U.S. dollars with use of the consumer price index for medical care services (2).

Between 2005 and 2018, annual total payments increased by 173% ($4,991, from $2,884 to $7,875) for bolus insulin, by 193% ($3,672, from $1,900 to $5,572) for basal insulin, and by 253% ($6,162, from $2,438 to $8,600) for premix insulin. Among bolus insulin,

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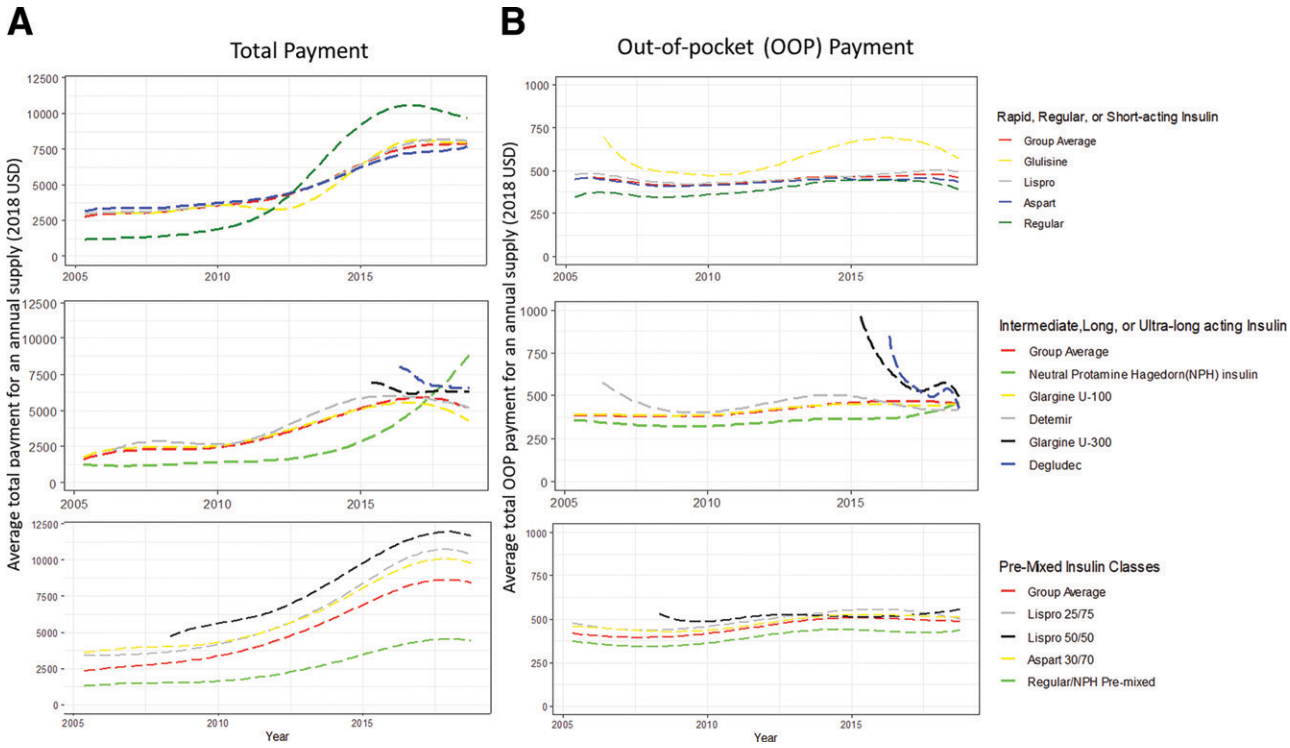

Figure 1 –Total payment and out-of-pocket payment on a yearly supply of insulin between 2005 and 2018.

relative payment increases were highest for regular insulin (707%), followed by lispro (168%), glulisine (163% [2006–2018]), and aspart (128%). Among basal insulins, we observed higher payment increases for NPH (555%) than for glargine U-100 (133%) and detemir (113% [2006–2018]). At their introduction in 2015 and 2016, payments for glargine U-300 and degludec were higher than for other basal insulin and slightly decreased until 2018. In 2018, human insulins were more expensive than insulin analogs in both basal (i.e., regular) and bolus (i.e., NPH) groups. Total payment increases for all three insulin groups plateaued after 2017.

Annual OOP payments increased by 4% ($20, from $453 to $473) for bolus insulin, by 21% ($80, from $385 to $465) for basal insulin, and by 21% ($86, from $409 to $495) for premixed insulin between 2005 and 2018. Generally, OOP payments for existing insulins were stable or increased marginally, whereas OOP payments for the newer and more expensive insulin types glargine U-300 and degludec decreased significantly.

In privately insured adults with diabetes in the U.S., average total and OOP payments for annual insulin supply between 2005 and 2018 increased by ∼$8,663 and ∼$100 for patients using bolus-basal insulin and by ∼$6,162 and ∼$86 for those who took premix insulin. The large increase in total payments and the small increase in OOP payments imply that patients insured by commercial plans are shielded from the insulin price increase during the period, which is contrary to the OOP payment change in Medicare Part D enrollees. This might be partially explained by the unique cost-sharing mechanism of Medicare Part D (i.e., the donut hole). Our recent study on the noninsulin drug payments trend (2005–2018) revealed that the average payment increase for noninsulin drugs was mainly driven by patients switching from the old drug classes to the high-cost newer drugs (e.g., sodium –glucose cotransporter 2 inhibitors and glucagon-like peptide 1 receptor agonists), and payment increase in each drug class was not significant (3). However, for insulin, the payment increase was observed in all of the insulin classes. As a limitation, it should be acknowledged that the presented total payment data do not account for rebates granted by manufacturers to payers, either directly or through pharmaceutical benefit managers. Some of the payment increases could have been offset by the rebates and discounts from manufacturers to payers (4).

The increasing and high payments for insulin have brought public and policymakers' attention. Professional organizations like the American Diabetes Association have advocated improving insulin affordability through legislative changes (5). Centers for Medicare & Medicaid Servicesand some states have recently implemented new policies or legislature to limit the overall payment and the copay for insulin. Our results suggest that the insulin payments plateaued by the end of our observation period (i.e., 2018).

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