

Comparing medical utilization between insulin pen and vial users within a pediatric Medicaid Accountable Care Organization



Ling Wang, MPH, PhD, Jonathan Vecchiet, PharmD

Partners for Kids and Data Resource Center
at Nationwide Children's Hospital



Background

Type-1 diabetes (T1DM) is commonly managed with exogenous insulin administration via insulin pens or vials. Although vials are less expensive than pens, studies have shown cost effectiveness of insulin pens over vials when considering the correlation on health outcomes such as: medical utilization, hypoglycemia, adherence, and persistence.¹ In this study, Partners For Kids (PFK), a pediatric Accountable Care Organization (ACO) affiliated with Nationwide Children's Hospital, compares the medical utilization consumed by pen and vial users in a pediatric Medicaid managed care population.¹ The objective of this study is to compare the medical utilization of pediatric T1DM patients who use insulin vials versus insulin pens.

Methods

Data Source:

- Prescription and medical claims were extracted from PFK's claims database

Study Period:

- October 1st 2011 to June 30th 2015

Study Population:

- Inclusion criteria: Patients with ≥ 2 insulin pen or vial prescription claims during the study period
- Exclusion criteria: with ≥ 1 medical claim(s) for type II diabetes **OR** with ≥ 1 prescription claim(s) for metformin

Data Analysis:

- Index date for each patient was defined as the date of the first prescription claim for insulin pen or vial
- Patients medical utilization between the index date and end of the study period were analyzed
- Medical utilization included: ED visits, inpatient visits, and outpatient visits
- The association between medical utilization and months on vial or pen was examined using logistic regression models

Results

1,418 patients were studied across five contracted payers. Results summarized below and in Table I

After adjusting for days supply:

- Odds of ED visits among vial users was 1.3 times that of pen users (OR=1.3; $P<0.0001$)
- Odds of inpatient visits among vial users was 1.5 times that among pen users (OR=1.5; $P<0.00001$)
- In contrast, odds of outpatient visits among pen users was 1.1 times that among vial users (OR=1.1; $P=0.0023$)

Results

Table I. The Odds Ratio of Medical Visits among Pen Users and Vial Users

Visit Type	Insulin Type	Adjusted Odds Ratio	P-value
Emergency Department	Pen	1	<0.0001
	Vial	1.3	
Inpatient	Pen	1	<00001
	Vial	1.5	
Outpatient	Pen	1.1	0.0023
	Vial	1	
Other Visits	Pen	1.4	<0.0001
	Vial	1	

Adjusted for prescription days supply

Discussion

ED visits and inpatient hospital visits were significantly greater in vial users compared to pen users, however, outpatient visits were significantly greater in pen users compared to vial users. This study provides evidence to show a correlation between insulin pen utilization and a reduction in unfavorable healthcare expenditures (ED visits and inpatient hospital stays) and an increase in favorable healthcare utilization (outpatient provider visits). As formulary decision makers consider utilization criteria for insulin, this study offers evidence to support a correlation between reduced medical utilization in patients with type-1 diabetes who use insulin pens over vials. PFK has ongoing studies to evaluate rates of hypoglycemia, adherence, and persistence in these two study arms as well.

References

1. Kelleher KJ, Cooper J, Deans K, Carr P, Brill R, Allen S, Gardner W. Cost saving and quality of care in a pediatric accountable care organization. *Pediatrics*. 2015 Mar;135(3):e582-9. doi: 10.1542/peds.2014-2725.
2. Bastian MD, Wolters NE, Bright DR. Insulin pens vs. vials and syringes: differences in clinical and economic outcomes. *Consult Pharm*. 2011 Jun;26(6):426-9. doi: 10.4140/TCP.n.2011.426.

Acknowledgements

Nationwide Children's Department of Pharmacy and Data Resource Center, and Partners for Kids