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Impact of 2019 Diabetes Guideline on Prescription Patterns of Antidiabetic Drugs for Patients with Type 2 Diabetes

RWD79

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INTRODUCTION

Motivation

- Each year, the American Diabetes Association (ADA) publishes a new version of the "*Standards of Care in Diabetes*," which includes recommendations for pharmacological approaches to glycemic control in patients with type 2 diabetes
- Mirroring the FDA's recognition of cardiovascular considerations in diabetes treatment, the ADA revised the "Pharmacologic Approaches to Glycemic Treatment" section of its guideline in 2019 to echo the ADA-EASD consensus report, making the guideline start considering key patient factors like:
  - atherosclerotic cardiovascular diseases
  - chronic kidney disease
  - heart failure, etc.
- In short, SGLT2 and GLP-1 with proven cardiovascular benefit are recommended according to the risk imposed and GLP-1s are recommended to be the first injectable medication in general

Objective

- This study aims to investigate the impact of the 2019 diabetes guideline on the prescription patterns of antidiabetic drugs for patients with type 2 diabetes

METHODS

Study Design

- Segmented linear regression analysis

Data

- Optum Clinformatics Data Mart
- Non-insulin glucose-lowering medications prescribed for type 2 diabetes
- January 1st 2018 to December 31st 2019

Variables of Interest

- Prescription rates $\boldsymbol{Rate_{i,t}}$ were quantified quarterly as a proportion of the number of prescriptions for each drug:

$$\boldsymbol{Rate_{i,t}} = \boldsymbol{\beta_{0,i}} + \boldsymbol{\beta_{1,i}} \cdot \boldsymbol{time_{i,t}} + \boldsymbol{\beta_{2,i}} \cdot \boldsymbol{Indicator(Guideline\ Publish_{i,t})} + \boldsymbol{\beta_{3,i}} \cdot \boldsymbol{(time_{i,t} - TimeOfPublish_{i,t})} + \boldsymbol{e_{i,t}}$$

- β_0, baseline level of the rate
- β_1, pre-Guideline trend
- β_2, any immediate (i.e., level) effect of the guideline publication
- β_3, any post-guideline trend effect

RESULTS

- *Table 1* shows that the pseudo-cohorts have balanced characteristics:
  - Approximately 62% of the nearly 2 million patients prescribing in both years
  - The cohort exhibited a mean birth year of 1953
  - 51% being female
- In *Table 2*, the analysis revealed statistically significant changes (p-value > 0.05) in both the level and trend of the prescription rates following a structural break between the fourth and fifth quarters
- Notable exceptions:
  - Empagliflozin, semaglutide, and metformin, have inconclusive level change post-interruption
  - Dapagliflozin and lixisenatide, have inconclusive the trend impact

Table 1: Descriptive statistics of the sample

Total sample size		1,962,790			
Time		2018	2019	Q4	Q5
All patients					
	count	1,505,879	1,586,364	1,152,540	1,168,136
	Female	51.00%	51.00%	50.40%	50.30%
	Year of Birth	1953	1954	1953	1953
	(SD)	13.31	13.2	12.58	12.54
Patients only in Pre					
	count	456,310			
	Female	51.60%			
	Year of Birth	1957			
	(SD)	15.19			
Patients only in Post					
	count		375,475		
	Female		51.70%		
	Year of Birth		1958		
	(SD)		14.14		
Patients only in Q4					
	count			266,664	
	Female			51.50%	
	Year of Birth			1955	
	(SD)			13.76	
Patients only in Q5					
	count				250,915
	Female				51.10%
	Year of Birth				1955
	(SD)				13.52

Table 2: Regression results

	Level origin	Trend origin	Level interruption	Trend interruption
	$\boldsymbol{\beta_0}$	$\boldsymbol{\beta_1}$	$\boldsymbol{\beta_2}$	$\boldsymbol{\beta_3}$
Empagliflozin	2.13%	0.28%	0.10%	0.09%
p-value	0	0	0.129	0.017
Canagliflozin	2.72%	-0.07%	-0.13%	0.04%
p-value	0	0	0.003	0.012
Dapagliflozin	0.42%	0.00%	-0.19%	0.00%
p-value	0	0.459	0	0.53
Liraglutide	2.41%	0.01%	-0.10%	-0.07%
p-value	0	0.024	0.002	0
Semaglutide	-0.03%	0.02%	-0.13%	0.29%
p-value	0.527	0.188	0.056	0
Exenatide ER	0.67%	0.04%	-0.05%	-0.05%
p-value	0	0	0.014	0.001
Lixisenatide	0.08%	0.03%	0.00%	-0.01%
p-value	0	0	0.603	0.055
Metformin	53.96%	-0.12%	-0.09%	-0.08%
p-value	0	0.003	0.214	0.033

Figure 1: Prescription rate of drugs in different classes of anti-diabetics

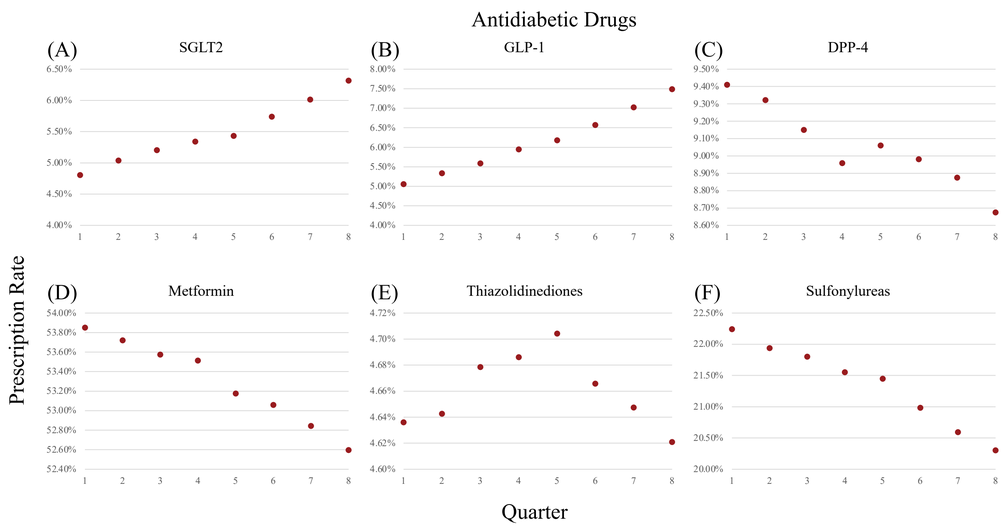


Figure 2: Prescription rate of drugs in SGLT2 class

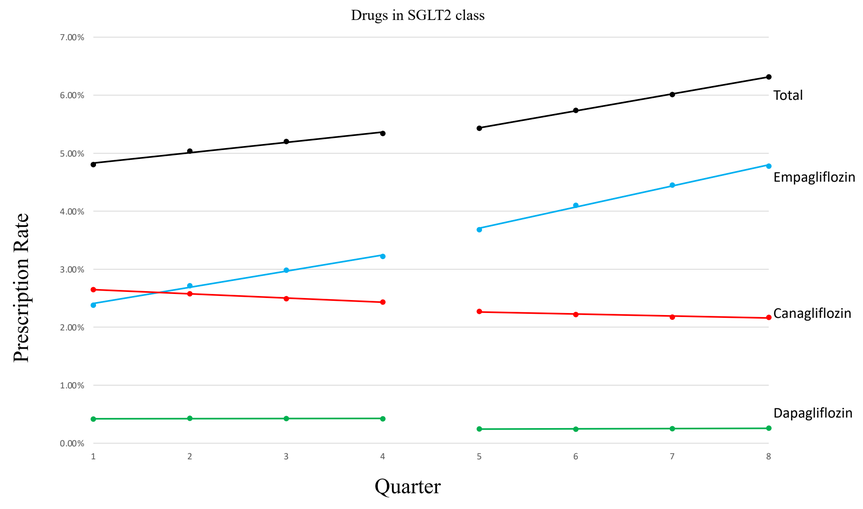
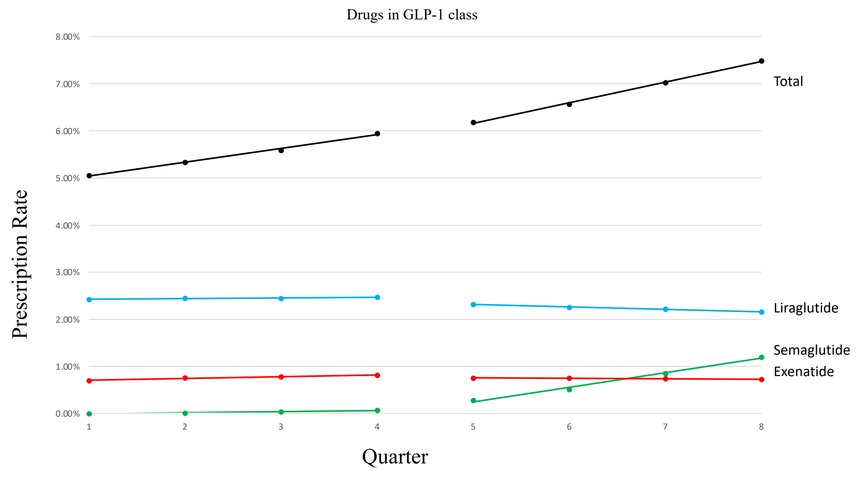


Figure 3: Prescription rate of drugs in GLP-1 class



DISCUSSIONS

- Between 2018 and 2019, the number of T2D drug prescribers identified in this claims data increased from approximately 1.51 million to 1.59 million, a rate of increase slightly above the annual new cases estimated by the CDC
- This uptick may be attributable to the 2019 diabetes care guidelines, which introduced recommendations for newer SGLT2 inhibitors and GLP-1 receptor agonists, potentially enhancing their adoption
- Among SGLT2 inhibitors:
  - Empagliflozin was pivotal in driving the overall increase
  - Conversely, canagliflozin's impact was opposite
- In the realm of GLP-1 receptor agonists
  - Liraglutide and exenatide experienced reductions in prescriptions post-guideline
  - Semaglutide, however, significantly contributed to the growth
  - Dulaglutide significantly contributed to the overall upward trend
- Metformin maintained its status as the first-line therapy for T2D until the 2022 guideline update. However, its role was nuanced in the 2019 guidelines to consider additional comorbidities
- Limitations:
  - The true impact of the guideline changes may be obscured by anticipatory behaviors
  - The actual application of these guidelines may extend beyond these intended groups due to factors like patient preferences and proactive provider decisions

REFERENCE LIST

For a full list of references, please contact the author

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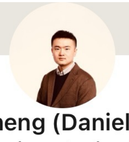

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