# Reasons for Discontinuation of Ozempic Using a Natural Language Processing Pipeline on Unstructured Clinical Notes

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## BACKGROUND

- Reasons for the discontinuation (r/dc) of pharmacologic agents in medicine, though representing potentially valuable information for physicians and life sciences manufacturers, are largely unreported in structured electronic health record (EHR) data.
- However, r/dc may be in unstructured EHR data, within physician notes.
- An automated natural language processing (NLP) pipeline that could extract and classify r/dc would potentially be useful for physicians and life sciences manufacturers.
- In recent years, many new Glucagon-Like Peptide-1 receptor agonists (GLP-1 RAs), including semaglutide (Ozempic) have been approved by the US Food and Drug Administration for chronic weight management.<sup>1</sup> However, r/dc of these pharmacologic therapies are poorly understood.

## OBJECTIVES

 The objective of this research was to understand reasons for discontinuation (r/dc) of Ozempic (semaglutide) through NLP of clinical notes from EHRs.

## METHODS

- Clinical note sentences of Ozempic patients from 5 health systems in the OMNY Health database from 2017- 2024 were included if they contained the strings "Ozempic" or "semaglutide."
- To identify r/dc, a question-answering (QA) pipeline was constructed that queried each sentence with the question "Why was the {Ozempic | semaglutide} stopped?"
- Non-null answers were extracted using a transformer-based model fine-tuned for QA and mapped to 7 r/dc categories using a separately-fine-tuned text classification model having 91.4% accuracy for the task:
- Adverse drug event (ADE)
- Drug or disease contraindication (DDC)
- Finance-related (FIN)
- Symptom resolution (RES)
- Lack of efficacy (LE)
- Pregnancy-related (PRG)
- Miscellaneous (MISC)
- ADE were further resolved into International Classification of Diseases, Tenth Revision (ICD-10) codes using a licensed ICD-10 code resolution model and manually corrected as needed.
- Results were qualitatively examined for accuracy and compared to product labeling.

# RESULTS

- 1.22 million sentences across 91,094 patients were included.
- Distributions of included population demographics are presented in Figure 1.
- Included patients were predominant female, White, non-Hispanic, and ages 45 years and older.

#### Figure 1: Included Study Population Demographics



- 9,385 sentences contained a r/dc.
- Frequency of r/dc of Ozempic (semaglutide) by r/dc category are presented in Figure 2.
- Together, ADE and FIN categories accounted for more than half of r/dc.
- DD C and MISC together accounted for a third of r/dc; RES, LE, and PRG each accounted for less than 10% or r/dc
- Top ICD-10 codes associated with Ozempic (semaglutide) adverse drug events are presented in Table 1.
- Gastrointestinal-related symptoms accounted for 4 of the top 6 resolved ICD-10 codes.
- Other top codes included abnormal weight loss and unspecified.

#### Figure 2: Frequency of Reasons of Discontinuation of Ozempic (Semaglutide) by Category



# DISCUSSION AND CONCLUSIONS

- R/dc frequencies align with intuition, given high out-of-pocket costs and frequently reported adverse events of Ozempic.
- Further, ADEs were largely gastrointestinal, consistent with product labeling.
- Our results demonstrate the feasibility of NLP for extracting r/dc from clinical notes.
- Further work is necessary to evaluate consistency across other GLP1 RAs and improve accuracy, optionally using large language models.

#### Table 1: Resolved ICD-10 codes Associated with Ozempic (Semaglutide) Adverse Drug Events

ICD-10 Code	ICD-10 Description	Count (%)
R11.0	Nausea	439 (14%)
-	Unspecified	300 (9%)
K63.89	Other specified diseases of intestine	239 (7%)
R19.7	Diarrhea	126 (4%)
R63.4	Abnormal weight loss	115 (4%)
K59.0	Constipation	109 (3%)

# REFERENCES

 Wang, Jing-Yue, et al. "GLP- 1 receptor agonists for the treatment of obesity: Role as a promising approach." Frontiers in endocrinology 14 (2023): 1085799.

## CONTACT INFORMATION

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