

**Digesting Ozempic: How information sources on the type 2 diabetes drug Ozempic can
affect patient understanding and decision making**

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Abstract

The growing prevalence of type 2 diabetes mellitus (T2DM) has been accompanied by the development of new medications for treating the condition. One such medication is semaglutide, which has been extensively discussed in the media under its brand name Ozempic due to its potential for causing weight loss. Amidst the growing discourse surrounding Ozempic, alongside evidence that patient information sources can be inaccessible or unreliable, the research question addressed here is: how is the framing of information on Ozempic, from passive and active information sources, impacting how patients with T2DM in Canada come to understand and make decisions regarding their health? The approach to answering this question involved collecting artifacts from passive and active information sources, before performing first a content then closer rhetorical analysis to discover which frames, or terministic screens, were employed. It was observed through this analysis that passive sources like news and social media often exclude much of the science behind Ozempic to focus on the weight loss discourse. These sources also sometimes provide inaccurate scientific information, which can be misleading to patients. The active sources like websites and pharmacy handouts, meanwhile, cover more, though not all, of the science behind Ozempic, but their complexity and structure can make the information more difficult to comprehend. Overall, it is clear that no single source provides a comprehensive coverage of Ozempic to allow T2DM patients to make informed decisions, and even spread across multiple source types, gaps remain that need to be addressed.

Keywords: Ozempic, health information, type 2 diabetes patients, media, terministic screens

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Introduction

Type 2 diabetes mellitus (T2DM) is a metabolic disease characterized by high blood glucose levels (Lin & Sun, 2010). It is the result of a reduced sensitivity to insulin, which is a hormone that works to lower blood glucose levels when they rise above normal limits (Lin & Sun, 2010). The disease can lead to cardiovascular complications, kidney failure, blindness, amputation, and a decrease in mental health, especially if not treated (*Diabetes in Ontario Background*, 2020; Hosseini et al., 2019). Discussions around diabetes are growing in the healthcare literature as the prevalence of the disease increases both nationally and internationally (*Diabetes in Ontario Background*, 2020; Hosseini et al., 2019).

A relatively new group of medications that have emerged for the treatment of T2DM are the glucagon-like peptide-1 (GLP-1) receptor agonists (RA) (Tomlinson et al., 2016), including one called Ozempic. These are synthetic hormones, which act to supplement the GLP-1 naturally occurring in the body, thereby lasting longer to help with blood glucose control as well as weight loss (Meier, 2012; Tomlinson et al., 2016). GLP-1 has these effects by acting directly on digestive organs, like the pancreas, while also targeting areas of the brain to control appetite (De Silva & Bloom, 2012). Due to these actions, the use of GLP-1RA drugs as a method for weight loss by people without metabolic disease is becoming more common, especially by celebrities in the United States and as perpetuated by the media (Fox, 2022; McCartney, 2023). With the emergence of such GLP-1RA medications and their growing popularity in the media, a question arises of whether T2DM patients can adequately inform themselves of how their medications work, and how their understanding of their health might be affected by the various messages they are receiving.

Literature Review

The breakthrough of semaglutide

Arguably the most well-known and widely discussed GLP-1RA medication is semaglutide. Semaglutide was developed by the drug company Novo Nordisk for the treatment of T2DM, and was first sold under the brand name Ozempic (Dhillon, 2018). Semaglutide mimics the actions of GLP-1 in the body, meaning it acts in the gut and in the brain to regulate blood glucose levels, slow gastric emptying, and lower appetite (De Silva & Bloom, 2012). In Canada, Ozempic is approved for the regulation of blood sugar levels in individuals with T2DM, with certain caveats including one stating that it should be taken alongside diet and exercise (Novo Nordisk, 2022). In the United States, Ozempic is additionally approved for reducing the risk of cardiovascular disease in individuals with T2DM (FDA, 2023). Hence, Ozempic is not approved for weight loss in any population, including those with diabetes, despite trials demonstrating weight loss in many who take it (Novo Nordisk, 2023). Wegovy, however, is a higher-dose semaglutide medication that is intended for weight management in individuals with obesity and overweight, who also have a weight-related co-morbidity (Burki, 2022).

Due to significant reported weight loss from taking semaglutide, Ozempic has become popular for individuals looking to lose weight even if they do not have a metabolic disease, which is considered an off-label use (Han et al., 2023). This popularity has grown from extensive media coverage of the drugs' weight loss abilities, as well as some celebrities who publicise their Ozempic experiences (Burki, 2022; Han et al., 2023; McCartney, 2023). An often-overlooked issue with weight loss from both medications, however, is that much of the weight lost while taking them is regained once the medication is stopped (McCartney, 2023; Wilding et al., 2022).

The usage of Ozempic and Wegovy for weight loss in this way can cause issues for those who rely on these medications for their health. Ozempic's popularity on social media led to such a demand for the drug that global shortages occurred, making it difficult for those with metabolic diseases to obtain their semaglutide prescriptions (Burki, 2022). It does appear, however, that these shortages have not yet impacted Canada (*The Supply and Use of Ozempic*, 2023). Aside from potential shortages, widespread messaging regarding Ozempic can encourage stigma and shame regarding the medication. Individuals who are taking Ozempic may sometimes feel like they can't discuss their use of it, as they may be seen as lazy, which is not aided by celebrities who appear ashamed of their use of it (Moran, 2023). It has also led some individuals with obesity or overweight to feel pressured to take the medication, sometimes even by their physicians, despite feeling it is not right for them (Moran, 2023).

The discourse in the media surrounding Ozempic, then, is potentially damaging to patients with T2DM and others with metabolic disease. An investigation into information sources on Ozempic, and the framing of information within those sources, could then be beneficial. While the discussion of weight loss with Ozempic through TikTok has been investigated, and its implications considered (Lennon, 2023), a complete consideration of available sources, and the implications for T2DM patients, remains absent in the literature.

Passive reception and reliability of news and social media

With the significance of media and social media discourse surrounding Ozempic, it is important to consider the nature of these information sources. Social media is not always a trustworthy source of information, with it having been found that one fifth of news stories from TikTok search results contain some misleading information (Burki, 2022). This statistic is concerning when, as of June 2023, #ozempic had received over 930 million views from users on

the platform (Wojtara et al., 2023). Despite a large turn to social media for information on health topics, some individuals can generally remain hesitant to rely on information shared through social media due to concerns about trustworthiness and information quality (Y. Zhao & Zhang, 2017). This does not, however, prevent stories about major weight loss due to taking Ozempic from circulating (Burki, 2022).

Furthermore, there is a growing population that is choosing to trust the information shared through their social media due to a “news-finds-me” perception (Gil de Zúñiga et al., 2017). Individuals may believe they don’t need to look for news because they will be exposed to it in their daily activities, including through their social media feeds (Gil de Zúñiga et al., 2017). This passive way of engaging with news stories while still feeling informed about world news can lead people to be less knowledgeable about what is actually happening (Gil de Zúñiga et al., 2017). This learning approach can be especially concerning when talking about science news, including that about Ozempic.

Individuals who still do not see social media as trustworthy, or who are interested in learning more, may instead look to find health information in news coverage more specifically. This can also be problematic as news media will often selectively cover scientific research that makes for a more dramatic story (Saguy & Almeling, 2008). Coverage of semaglutide, the active ingredient in Ozempic, has included such ideas as winning the “fight against flab” and that Ozempic is a “weight loss game changer”, while ignoring some of the discussed issues with its off-label use (McCartney, 2023). Furthermore, news organizations will sometimes include quotes from individuals with conflicts of interest with the pharmaceutical company that develops Ozempic, without stating these conflicts (McCartney, 2023). This introduces a potential bias that

readers deserve to be aware of, especially those making decisions about whether to take the medication based on what they are reading.

The possible misrepresentation of information on Ozempic in news and social media is especially concerning when thinking about how it can impact the people interacting with the information that is shared. The way information is framed in the media can affect both how people understand, and how they choose to act in a situation (Saguy & Almeling, 2008). One study during the COVID-19 pandemic found that the news source an individual trusted, regardless of political persuasion, affected the risk mitigation behaviours that an individual would undertake (E. Zhao et al., 2020). This demonstrates how the framing and approach used in covering a health topic can influence an individual's understanding of what they should do for themselves, which can extend to the extensive coverage of Ozempic for individuals with T2DM.

Active searching and complex information sources

Despite the significant coverage of Ozempic in the media, some individuals with T2DM may look to more actively seek out information for themselves. Many studies have found that patients will tend to rely on medical printouts from pharmacies for information regarding their medications (Nair et al., 2002; Rolland, 2000). There is a problem, however, with this heavy reliance on patient handouts, as studies have frequently shown that the reading level of these handouts can far exceed the reading level of the patient relying on the information (Badarudeen & Sabharwal, 2010; Rolland, 2000). Governing bodies generally recommend that medical information be kept to a reading level between Grades 6 and 8 to remain comprehensible by the general population (Badarudeen & Sabharwal, 2010). This is especially important when illiteracy rates remain high. As much as 48% of Canadian adults can only read up to this Grade 6-8

reading level (OECD, 2013). Despite these high illiteracy rates, reading levels for these medical printouts have been found to range from Grade 10 to beyond Grade 12 (Rolland, 2000).

This problem can extend to other information sources as well, as many patients are turning to the Internet to obtain medical information instead. In fact, up to 86% of American adults with a chronic condition get their health information online (McInnes & Haglund, 2011), and even in the early 2000s, the third most frequently searched topic was health information, only behind email and general browsing (Eysenbach, 2008). One might expect these online sources to be easier to understand, and to work as a replacement for the information provided at the pharmacy. However, a study by McInnes & Haglund (2011) demonstrated that the reading level of 352 websites regarding medical conditions, including diabetes, were all above a Grade 8 reading level. Even in more open sources like Wikipedia, and other frequently occurring search results, this more advanced reading level was observed (McInnes & Haglund, 2011). This is especially relevant as a recent study by Han and colleagues (2023) demonstrated an exponential increase in searches for Ozempic in the United States.

Other research has emphasized how individuals are likely to turn to news sources compared to scientific articles for information (Saguy & Almeling, 2008), quite possibly due to the complexity of certain health related topics. Since many of the primary sources of information provided to patients may not be written in a way that is understandable to them, it is likely this turn to news can occur, leading to the potential issues discussed with relying on media sources. Considering all of this together remains concerning, as health literacy, and the ability of an individual to understand their condition and treatments, has been found to be the most significant predictor of a person's health status (Badarudeen & Sabharwal, 2010).

The gap in the literature

Even with the existing body of research regarding the readability of health information sources, and the role of the media, it has not yet been studied how patients' understanding and actions might be influenced by sources discussing GLP-1RA medications. There exists comprehensive knowledge of the various sources patients might come across both passively and actively, as well as certain search patterns related to Ozempic (Han et al., 2023) and the content presented in TikTok videos about the drug (Lennon, 2023). It is unclear, however, how these various different sources are framing information about Ozempic, and thus what messages patients might take away that can affect their health and well-being.

Hence, this study investigates the information that people with T2DM might come across, both from passively searched (henceforth 'passive') and actively searched (henceforth 'active') sources, and how these sources can affect their understanding of the medication Ozempic. Thus, the research question for this study is:

How is the framing of information on Ozempic, from passive and active information sources, impacting how patients with T2DM in Canada come to understand and make decisions regarding their health?

Methods

To answer this question, I conducted an analysis in three stages. First, I collected artifacts in written form from four sources, including two passive sources (news media, social media) and two active sources (websites, pharmacy handouts). These sources were selected to represent the types of information and content that patients would be exposed to regarding the drug Ozempic. Secondly, I performed a content analysis of these artifacts to identify which concepts and ideas were discussed in each source. Finally, I conducted a rhetorical analysis of a select number of these artifacts that were representative of the four source types, investigating the terministic screens employed. This allowed for the development of a deeper understanding of how the framing of an artifact might influence how patients think and act regarding Ozempic as a potential treatment for diabetes. This follows the generalized structure for conducting a rhetorical analysis, in which artifacts are identified, sorted, and investigated for specific aspects, before those aspects are considered in the context of a chosen rhetorical concept (Zachry, 2009).

This combination of a broader content analysis followed by a closer rhetorical analysis provides a robust means for understanding the potential impacts of these patient facing sources. Content analysis is a helpful methodology for allowing us to “develop a deeper understanding of a particular phenomenon... through a systematic process of interpretation” (Kynge, 2020). By developing a list of specific content, or ‘codes’, content analysis allows for artifacts to be understood and interpreted according to particular, simplified categories (Stemler, 2000). In the case of this research, a content analysis allows for interpretation of a larger subset of source material (from the four sources indicated) into a simplified means for analysis that still remains structured, yet fluid (Kleinheksel et al., 2020). By then following this content analysis with a rhetorical analysis, we can understand the effects of each piece of communication through the

application of ideas from the rhetorical tradition (Zachry, 2009). In the rhetorical tradition, language is seen as a form of action that can affect people in various ways (Crowley & Hawhee, 1999). Hence, a rhetorical analysis not only looks at how the composition of an artifact can contribute towards its purpose, but also how the composition of the artifact can affect the perceptions of the reader (Zachry, 2009). Thus, this methodology provides a means for understanding how the audience, T2DM patients, might understand and make meaningful decisions from these various resources.

Step 1: Collection

Article selection

I downloaded news articles published between January 1, 2023 and May 13, 2023 related to Ozempic as possible resources for this research project. During this period, Google Chrome recommended, through the mobile ‘Discover’ feature, news articles on Ozempic, many of which I saved for this work. These saved articles served as a representative sample of the information an individual might passively come across through the news about Ozempic. These articles were narrowed down to 12 selected articles (see [Appendix A](#)) using several criteria, specifically:

- **Written format:** Articles were only included if their primary format was in writing. A 2022 study demonstrated that a majority of Canadians prefer to engage with news primarily through text, or only occasionally through video (Centre d’études sur les médias, 2022).
- **Open access:** Articles were only included if they were open access, to ensure articles would be accessible to anyone coming across them.
- **News organizations:** Articles were only included if they were shared by a news organization based in Canada, the United States, or the United Kingdom. The same 2022

study demonstrated that, of the nine most visited English news brands by Canadians, four were Canadian, another four American, and the final one British (Centre d'études sur les médias, 2022). This finding suggests a high influence of American and British news media for Canadians, hence the significance of including American and British news in this study.

Social media post selection

In addition to the saved news articles, I saved three social media posts on Instagram over the same time period (see [Appendix B](#)). As discussed, social media is a frequently sought source of health information (Gil de Zúñiga et al., 2017; Y. Zhao & Zhang, 2017), and was demonstrated as one of the most common ways people come across news in Canada (Centre d'études sur les médias, 2022). These posts were included in the study as a significant passive source of information for Canadians.

Website selection

I next identified websites which would be actively searched for by T2DM patients. To avoid bias in search results due to previous searches conducted through my account, I used a desktop that was not previously associated with the research project to conduct a simple Google search. To keep the search general, and to mimic a common search from the past year related to Ozempic in Canada (*Google Trends*, 2023), the search was simply: “what is ozempic”. Studies have shown that few people go past the first page of a Google search result (Dean, 2020; Harold, 2022). Therefore for this study, only the first page of search results was reviewed, which included seven websites, two of which were news articles (see [Appendix C](#)). Links under ‘People also ask’ were not included as it has been shown that only 3% of searchers will investigate that menu (Dean, 2020).

Pharmacy handout selection

For the second set of actively sourced documents, I contacted a Certified Diabetes Educator at a pharmacy in Sudbury, ON, Canada, and acquired a pharmacy pamphlet and product monograph for Ozempic. These are standard resources provided to T2DM patients on Ozempic at the pharmacy, and can be accessed by those who request the information as well (D. Lai, personal communication, May 5, 2023). In addition to these, I collected handouts from random pharmacies in Sudbury selected through a random number generator. Of the handouts collected, there were copies of the same standard pamphlet and product monographs provided beforehand, and one additional handout that provided a shorter version of the pamphlet information. Hence, these three information sheets (the pamphlet, the product monograph, and the shortened pamphlet) were included in this study as a representative sample of what information an individual could obtain from a pharmacy regarding the medication (see [Appendix D](#)).

I downloaded all artifacts selected for analysis from their respective websites or locations, and those saved versions were used during analysis to avoid changes and variability over time during the research project at the live links.

Step 2: Content analysis

After collecting all written content, I drafted a checklist of concepts to search for in each artifact. These concepts, or ‘codes’ were informed by previous research and knowledge regarding Ozempic, as well as through emergent coding. The emergent process of determining the codes involved a first, brief reading of each artifact to identify important ideas that might be covered in each, and that were relevant to the research question. Then, the codes were made into a framework that was used as a checklist (see [Table 1](#)), where each artifact was read to identify if

the terms and concepts in the framework were used or described. Each code was made independent of one another. The prevalence of each code within each source media type was then tallied, providing a frequency count, as often conducted in content analyses (Stemler, 2000). This approach did not consider nuance, as the intention was to get a surface-level idea of what was present in each. This method is what Kleinheksel and colleagues (2020) have described as a manifest content analysis, in which the text is observed for what is actually there, without attempting to identify further meaning and interpretations. For the social media posts, the graphic(s) and the captions were included, but not comments from other users. For websites and articles, only content directly related to the page was included. No external links or menus were accessed, and no additional boxes were expanded. The entirety of each pharmacy pamphlet was considered, but for the product monograph only the “Patient Medication Information” section was included in analysis.

Table 1. Categories and related codes for artifact content analysis

Category	Codes
Concepts - Does it contain the term/concept, related to Ozempic	<ul style="list-style-type: none"> - Semaglutide - GLP-1(RA) - (Synthetic) hormone (context: GLP-1) - (Type 2) diabetes - Blood glucose/sugar (levels) control - Side effects (nausea, pancreatitis, etc.) - Wegovy/Rybelsus/other GLP-1RA medications
Science - Does it explain, in similar terms	<ul style="list-style-type: none"> - Ozempic mimics natural GLP-1 hormone - Acts on cells of the gut - Acts on cells of the brain - Actions include <ul style="list-style-type: none"> - Reducing appetite (brain) - Delay stomach/gastric emptying (digestion) - Reduce (gastric) acid secretion - Stimulate insulin secretion (inhibit glucagon secretion) - Actions make you feel full longer/faster - Lowered risk of cardiovascular complications - Difference between Ozempic and insulin - Ozempic should be used with good diet and exercise/important to exercise
Discourse - Does it discuss, in similar terms	<ul style="list-style-type: none"> - Ozempic/GLP-1 for weight loss - Medication shortage - Use/popularity from celebrities/media - The problem of using it short term/stopping use (regaining weight)

Step 3: Rhetorical analysis

Terministic screens were chosen as the focus for this rhetorical analysis as the research question asks for an investigation into how the framing of various artifacts might influence a patient interacting with the information shared.

Background on terministic screens

The rhetorical concept of ‘terministic screens’ was first introduced by Kenneth Burke in 1966 as a means of describing the significance of word choice (Pezzullo & Cox, 2018). More specifically, he used the idea of a ‘screen’ as a metaphor, describing how every word choice simultaneously selects a version of reality, while deflecting others (Pezzullo & Cox, 2018). With the many ways we can describe different contexts or situations, selecting to present the information through specific words or symbols inevitably chooses to present the information through one specific screen or frame (Blakesley, 2023). Clear examples of terministic screens come in looking at photographs, and how they can be viewed through different coloured screens to produce images that vary (Blakesley, 2023). The term often used in journalism for describing this is ‘media frames’, with all parts of an article often growing from one central theme, and therefore employing a specific ‘frame’ for audiences to see the situation through (Pezzullo & Cox, 2018). An analysis of the terministic screens employed in a communication artifact, then, involves looking at the choices made by the author, and how those choices affect the meaning and interpretation of an artifact (Blakesley, 2023). A significant piece of performing a rhetorical analysis related to terministic screens becomes the naming, or word choice, of an author (Pezzullo & Cox, 2018). It is important to consider, however, both what is included and what is excluded, while also considering the rhetorical situation in which the artifact exists (Blakesley, 2023). Note that in this paper, the terms ‘terministic screens’ and ‘frames’ are used interchangeably.

Approach to rhetorical analysis

After the content analysis was complete, one artifact of each of the four source types (news article, social media post, website, pharmacy handout) was selected. Artifacts were chosen

if they reflected much of the same content as other artifacts, to remain representative of the sample, but were also chosen if there was an opportunity for unique frames to be identified. For the social media post in particular, the post with the most content was selected to allow for a more thorough analysis, as the other two posts were much shorter. The selected artifacts can be seen as a narrowed focus on some of the content that is publicly available, but do not provide a generalizable overview of the type of content and framing that every artifact from the same information source would employ.

Due to the significance of considering the rhetorical situation in which an artifact exists, this was an important first step after artifacts were selected for analysis (Crowley & Hawhee, 1999). [Table 2](#) outlines the selected artifacts, as well as descriptions of their rhetorical situations.

Table 2. Artifacts chosen for rhetorical analysis, and their rhetorical situations.

Artifact	Rhetorical Situation
<p>News article: Smith, S. V. (2023, April 1). “You forget to eat”: How Ozempic went from diabetes medicine to blockbuster diet drug. <i>NPR</i>. https://www.npr.org/2023/04/01/1166781510/ozempic-weight-loss-drug-big-business</p>	<p>The selected news article was published by National Public Radio (NPR), an American non-profit media organization, on April 1, 2023 (<i>About NPR</i>, 2023). Their goal is to “create a more informed public”, sharing personal stories at local and national scales (<i>About NPR</i>, 2023; Smith, 2023). In this article specifically, the story of ShantaQuilette Develle Carter-Williams, who takes Ozempic, is shared (Smith, 2023). The article was written by Stacey Vanek Smith, who has a background in literature, writing, and journalism, and has often focused her work on economics (<i>Stacey Vanek Smith</i>, 2023). NPR draws an average 13.8 million weekly website visitors, and likely has a diverse audience due to their commitment to diversity and inclusion (<i>About NPR</i>, 2023; “Our Commitment To Diversity,” 2023). The article references the Academy Awards show, which had happened less than a month before, and came out amidst growing media coverage of Ozempic (Smith, 2023).</p>
<p>Social media post: @unbiasedscipod. (2023, January 30). <i>Ozempic</i>. Instagram. https://www.instagram.com/p/CoCoyBNu6HT/</p>	<p>The selected Instagram post was originally published on January 30, 2023 by @unbiasedscipod. The Unbiased Science Podcast is co-hosted by immunologist Dr. Andrea Love and public health scientist Dr. Jess Steier, and was launched during the COVID-19 pandemic (<i>About the Unbiased Science Podcast</i>, 2023). Their aim is “debunking science and health-related misconceptions”, and this post was created to address the growing coverage of Ozempic for what they deem “vanity-related weight loss” (<i>The Unbiased Science Podcast on Instagram</i>, 2023; @unbiasedscipod, 2023). Their content is most likely seen by their followers, as well as others who interact with similar content.</p>
<p>Website (citation on next page)</p>	<p>Medical News Today, part of the American company Healthline Media, aims to inform its audience, allowing them to develop a “deeper understanding of health”, covering many health topics and medications (<i>About Medical News Today</i>, 2023). They emphasize the science-backed, simplified content they share for their audience to be able to ask</p>

Artifact	Rhetorical Situation
<p>Website (continued) MNT Medical Network. (2023, February 16). <i>Ozempic: For weight loss, dosage, side effects, and more</i>. Medical News Today. https://www.medicalnewstoday.com/articles/326252</p>	<p>questions and take action when it comes to their health (<i>About Medical News Today</i>, 2023). The webpage was reviewed by Victor Nguyen, a licensed pharmacist who has worked as a consultant and communicator (<i>Victor Nguyen, PharmD, MBA</i>, 2023). Their website brings in over 85 million visitors per month, targeting both the general public and physicians (<i>About Medical News Today</i>, 2023). The audience for their page on Ozempic in particular would be those who are interested in learning more, or who are already taking the medication.</p>
<p>Pharmacy handout: see Appendix D, Handout 1: Pamphlet</p>	<p>This pharmacy handout was obtained from a licensed Canadian Diabetes Educator, and is printed with each new prescription, though can also be given to anyone who requests the information (D. Lai, personal communication, May 5, 2023). The handout was developed by First Databank, an American healthcare company that is the “leading provider of clinical and descriptive drug knowledge” (<i>About Us - First Databank</i>, 2023). These handouts are created for patients, not physicians, to inform them about the medication and how to take it. There is specific information that is regulated to be included when a patient is given a prescription (<i>Prescribing Drugs</i>, 2019), which this handout is likely made to fulfil.</p>

After selection, artifacts were read closely to identify elements of the text, both visible and absent, that reflected the choices made by the author. I made annotations alongside each artifact, and then reviewed those annotations to extract patterns and general themes related to the terministic screens employed in each.

Limitations

It is acknowledged that there are limitations to this methodology. Firstly, I as the primary researcher am not diabetic, and hence am not able to conduct the analysis from the direct point of view of a T2DM patient. Therefore, any conclusions drawn may not directly reflect the sentiments of an actual diabetes patient in Canada.

Secondly, it is worth noting that both the articles and posts I came across may have stood out to me more than the average individual due to my interest in this research area. By opening these articles repeatedly, it may have influenced the algorithms recommending this content so that I saw more articles than an average consumer would in Canada. These are still seen as a representative sample, however, as they would be reasonable for an individual to come across, whether they were searching for it or not.

Additionally, it can be difficult to structure a rhetorical analysis due to the various, and sometimes inconsistent, rhetorical theories, hence the focus must be narrowed (Zachry, 2009). For both the content and rhetorical analyses, time and resource constraints for this research also mean that inter-coder reliability was not achievable.

Finally, focus groups would have been an ideal method for conducting this investigation to reduce the limitation of not hearing from patients directly. However, due to time and resource constraints with this project this was not possible.

Despite these limitations, this approach is seen as a robust means of beginning to investigate messages surrounding Ozempic and the impact on decision making in T2DM patients.

Results and Findings

Content Analysis

For some concepts, the differences between the passive and active sources are notable. For instance, each website and pharmacy handout discusses blood glucose control, while only 5/12 of the news articles and 1/3 of the social media posts do. Similarly, each website and handout discusses side effects, while only half of the articles and 1/3 of the social media posts do so. A commonality of all data sources is that each one mentions type 2 diabetes.

In terms of the science more specifically, there is less coverage in the articles (1/12) and social media posts (0/3) about Ozempic lowering cardiovascular risk, compared to in the websites (7/7), as well as 1/3 of the handouts. A similar pattern is observed surrounding the importance of diet and exercise accompanying the medication, where the articles (3/12) discuss this less frequently than the websites (5/7), though the social media posts and handouts cover this equally (1/3). Conversely, there is higher coverage of the weight-loss science (such as reduced appetite and slowed stomach emptying) in the articles (8/12) and websites (6/7) compared to the social media posts (1/3) and pharmacy handouts (0/3). Overall, however, there is low representation of the science across all sources, with some concepts not touched on in any, and others in very few.

Finally, regarding the discourse around Ozempic, there is varied coverage. None of the pharmacy handouts cover the Ozempic discourse, while at least half of the articles cover each discourse concept being investigated, with all 12 mentioning Ozempic for weight loss. The social media posts vary in their coverage of each discourse concept, with all three mentioning Ozempic for weight loss, but only one discussing the problems of using it short term. The websites also vary in their coverage, with 6/7 discussing Ozempic for weight loss, but less than half covering each of the other main concepts in the discourse around Ozempic.

The frequencies of all codes found in the content analysis are summarized in [Table 3](#).

Table 3. Results of codes and categories for artifact content analysis.

	News Articles	Social Media Posts	Websites	Pharmacy Handouts
Concept - Does it contain the term/concept...				
Semaglutide	$\frac{8}{12}$	$\frac{1}{3}$	$\frac{7}{7}$	$\frac{2}{3}$
GLP-1(RA)	$\frac{5}{12}$	$\frac{1}{3}$	$\frac{6}{7}$	$\frac{1}{3}$
(Synthetic) hormone (context: GLP-1)	$\frac{3}{12}$	$\frac{1}{3}$	$\frac{3}{7}$	$\frac{1}{3}$
(Type 2) diabetes	$\frac{12}{12}$	$\frac{3}{3}$	$\frac{7}{7}$	$\frac{3}{3}$
Blood glucose/sugar (levels) control	$\frac{5}{12}$	$\frac{1}{3}$	$\frac{7}{7}$	$\frac{3}{3}$
Side effects (nausea, pancreatitis, etc.)	$\frac{6}{12}$	$\frac{1}{3}$	$\frac{7}{7}$	$\frac{3}{3}$
Wegovy/Rybelsus/other GLP-1RA medications	$\frac{10}{12}$	$\frac{1}{3}$	$\frac{6}{7}$	$\frac{0}{3}$
Science - Does it explain...				
Ozempic mimics natural GLP-1 hormone	$\frac{2}{12}$	$\frac{1}{3}$	$\frac{3}{7}$	$\frac{1}{3}$
Acts on cells of the gut	$\frac{0}{12}$	$\frac{0}{3}$	$\frac{0}{7}$	$\frac{0}{3}$
Acts on cells of the brain	$\frac{2}{12}$	$\frac{1}{3}$	$\frac{2}{7}$	$\frac{0}{3}$
Actions include				
<i>1. Reducing appetite (brain)</i>	$\frac{8}{12}$	$\frac{1}{3}$	$\frac{6}{7}$	$\frac{0}{3}$
<i>2. Delay stomach/gastric emptying (digestion)</i>	$\frac{8}{12}$	$\frac{1}{3}$	$\frac{6}{7}$	$\frac{0}{3}$

	News Articles	Social Media Posts	Websites	Pharmacy Handouts
<i>3. Reduce (gastric) acid secretion</i>	$\frac{0}{12}$	$\frac{0}{3}$	$\frac{0}{7}$	$\frac{0}{3}$
<i>4. Stimulate insulin secretion (inhibit glucagon secretion)</i>	$\frac{4}{12}$	$\frac{0}{3}$	$\frac{6}{7}$	$\frac{2}{3}$
Actions make you feel full longer/faster	$\frac{5}{12}$	$\frac{0}{3}$	$\frac{3}{7}$	$\frac{0}{3}$
Lowered risk of cardiovascular complications	$\frac{1}{12}$	$\frac{0}{3}$	$\frac{7}{7}$	$\frac{1}{3}$
Difference between Ozempic and insulin	$\frac{0}{12}$	$\frac{0}{3}$	$\frac{3}{7}$	$\frac{0}{3}$
Ozempic should be used with good diet & exercise/important to exercise	$\frac{3}{12}$	$\frac{1}{3}$	$\frac{5}{7}$	$\frac{1}{3}$
Discourse - Does it discuss ...				
Ozempic/GLP-1 for weight loss	$\frac{12}{12}$	$\frac{3}{3}$	$\frac{6}{7}$	$\frac{0}{3}$
Medication shortage	$\frac{7}{12}$	$\frac{2}{3}$	$\frac{2}{7}$	$\frac{0}{3}$
Use/popularity from celebrities/media	$\frac{8}{12}$	$\frac{2}{3}$	$\frac{2}{7}$	$\frac{0}{3}$
The problem of using it short term/stopping use (regaining weight)	$\frac{6}{12}$	$\frac{1}{3}$	$\frac{3}{7}$	$\frac{0}{3}$

Rhetorical Analysis

Each of the following sections will dive into the findings of the rhetorical analysis for each artifact. A terministic screen was identified for each artifact, reflecting an identified key ‘importance’. These terministic screens are summarized in [Table 4](#).

Table 4. Terministic screens identified in each artifact during rhetorical analysis.

Artifact	Terministic Screen
News article	The story is the most important (so science should take a back seat)
Social media	Dispelling misinformation is the most important (at the cost of considering all audiences)
Website	All of the science information is important (but understanding may take a back seat)
Pharmacy handout	Safety is the most important (but it is the responsibility of the patient and their healthcare providers)

News article - focusing on the story

The identified terministic screen can be seen through the choice of language in the article. Specifically, the artifact presents both sides of the debate about whether Ozempic should be used for weight loss in individuals without metabolic disease. First, the drug is sensationalized in passages referring to it as a “blockbuster diet drug”, claiming that “the drug worked wonders”, discussing “Ozempic’s rise to superstardom”, and mentioning how it has become “a very hot commodity”. Despite the excitement behind this language choice, the language of the article also suggests the medication should not be used off-label for weight loss. In the title (although not consistently used throughout the rest of the article), “medicine” is used when mentioning its use for diabetes, while it is dubbed a “drug” (which may have negative connotations) in the context of its use for weight loss. It is also implied that there are people it is “intended to help”, or that the shortage due to its popularity “restricts and harms the people that really benefit from it, which are the diabetics”. This language creates an implied separation between those who should and shouldn’t take Ozempic, despite it not being stated explicitly. The significance of the medication for the health of individuals with metabolic disease is also emphasized when ShantaQuilette, the woman interviewed in the article, specifies that she “really needed it for [her]

health”, as well as when a doctor points out that Wegovy is “meant for people who are in a life-threatening situation”. Hence, the article both explicitly suggests caution with the medication and discusses the negative effects the medication shortage can have for individuals with metabolic disease, while using language that implicitly encourages its use for weight loss. This is done even somewhat explicitly, as the section titled “Psst... need some Ozempic?” tells people exactly where they can go to get an Ozempic prescription.

Considering the focus of the article is this back and forth about who should be taking the drug, the science is mostly absent. Furthermore, the main science piece that is included is only partially correct. It is correct to say that Ozempic can “help diabetes patients control their blood sugar” since Ozempic leads to insulin release, and “insulin lowers blood sugar”. After these details, however, the article incorrectly claims that insulin also “slows digestion and makes people feel full”, which is actually accomplished by GLP-1 (Willms et al., 1996). Finally, ShantaQuilette, who shares her story of taking Ozempic for her health, does not confirm whether she has T2DM and hence whether Ozempic may have helped regulate her blood sugar levels, as designed.

Social media - dispelling misinformation

The misinformation this post aims to dispel is about the use of Ozempic for weight loss in individuals without metabolic disease, emphasizing certain phrases to discourage further use of Ozempic. This includes mentioning that “Ozempic is for type 2 diabetes treatment, not for weight loss”, how the use of Ozempic in this way “has led to Ozempic shortages for people who need the medication to manage type 2 diabetes”, repeated in saying “patients who actually need the drug... are struggling to access it”, and that “it has not been tested in nondiabetic

populations”. It is also discussed how “unfortunately” its popularity perpetuated by celebrities led to shortages, emphasizing the issue of people taking it who do not need it for their health.

In addition to discouraging Ozempic use for weight loss, science is the focus of the post to address misconceptions on the subject. In the post, Ozempic and Wegovy are clearly distinguished, using correct language to describe them having the same active ingredient but clearly delineating their labelled uses. Simple descriptions, as well as specific statistics are also used to help with understanding. Specific details that are especially useful include imagery depicting the Ozempic pen and a glucose monitor, the emphasis on the importance of diet and exercise, the warnings of side effects, information about its FDA approval, and suggestions to individuals for using the medication effectively while seeking medical support where T2DM is suspected.

With this focus on scientific accuracy, it is somewhat surprising that there appears to be some incorrect information in describing how Ozempic works. Specifically, it is described that “semaglutide mimics a hormone... that targets areas of the brain that regulate appetite. This signals our brain that we’re full and causes our stomach to empty more slowly”. This description suggests that the stomach empties more slowly only because of signals to the brain, however GLP-1 acts on the stomach to slow emptying (Nakatani et al., 2017).

Website - covering all of the complex science

This terministic screen of trying to cover all scientific content possible is evident in the 23 separate sections contained on the webpage, with little information being screened out. This information ranges from what Ozempic is, to its side effects, all the way to the specifics of whether it can be taken while pregnant. In covering this many sections, however, clarity and accessibility of information is lost through an incoherent structure. Certain key information, such

as how Ozempic works, is buried in the webpage, pieces of information are repeated from the separation of similar concepts, and sections that relate to one another are spread out throughout the page. For example, interactions with other treatments, interactions with alcohol, and concerns around pregnancy and breastfeeding would be better placed with other warnings such as side effects to provide a comprehensive overview of potential areas for concern. This challenging structure makes the webpage less accessible to those looking for clear information.

Complex language used on the website can also contribute to difficulties in understanding. Some terms are helpfully expanded or further described, such as “pancreatitis (inflammation of the pancreas)”, and “diabetic retinopathy (diabetes-related eye problems)”. Additionally, a distinction is made between insulin and Ozempic, which could be a common misconception that isn’t often addressed, and the difference between Ozempic and Wegovy is more clearly described. However, many of the sections, especially those with important information, are above the standard recommended Grade 6-8 reading level. Using a readability formula assessment tool (*Automatic Readability Checker*, 2023), it was observed that sections describing how Ozempic works and its side effects are at a Grade 10 level, the introduction to Ozempic and description of its interactions are at a Grade 11 level, and the approved uses of Ozempic are beyond a high school level. Sections such as the Ozempic dosages and the description of type 2 diabetes, however, were at Grades 6 and 8, respectively. With such a focus on covering as much of the science content as possible, less of the content remains accessible to a wider audience due to its structural and technical complexity.

Pharmacy handout - safety is number one

It is clear that much of the focus of the pharmacy handout is to promote safe use of the medication. There is limited information on how the medication works, as it is screened out so

the emphasis can remain on using the medication properly. Most of the sections in the handout contain warnings, including the “important” section containing a disclaimer, the “warning” section highlighting the risk of thyroid cancer, and sections covering side effects, precautions, interactions, overdoses, and medical alerts. It is also of significance to note that the handout, similarly to the website, presents the information at an elevated reading level. Only two of the sections come in below a high school reading level, and the overall readability was assessed to be around Grade 10 (*Automatic Readability Checker*, 2023).

With the emphasis on safety of the handout, it is also made clear that safety is the responsibility of the patient and their healthcare providers, implying a lack of liability to the drug company if something goes wrong. Almost every section of the handout contains a statement informing patients that they should discuss any potential issues, or issues that arise, with their doctor, and follow their advice while using it. The handout begins with a statement emphasizing that “this information does not assure that this product is safe, effective, or appropriate for you”, and also makes such statements as, individuals should “follow [their] doctor’s instructions carefully”, “inject... as directed by [their] doctor”, and that it is important to “remember that this medication has been prescribed because your doctor has judged that the benefit to you is greater than the risk of side effects”. The responsibility is not solely placed on the healthcare provider, as seen in the handouts instructions to “tell your doctor”, “read [instructions]... learn... ask your doctor or pharmacist”, and “talk with your doctor or pharmacist about whether the dose(s) of your other diabetes medication(s) need to be lowered”. Patients are explicitly told that it is up to them to bring any concerns to their healthcare providers, and that they should be relying on the advice of those providers in taking this medication. The language of the handout avoids

reassurances regarding the medication in order to leave that responsibility elsewhere, placing that responsibility, and the responsibility to learn more, into the hands of the reader.

Discussion and Interpretation

From the results of these analyses, significant patterns emerge for both the passive and active artifacts with regards to the impacts the framing can have for individuals with T2DM. These key ideas are explored in the following section, followed by the potential implications of these findings.

Passive sources exclude much of the science in favour of weight loss discourse, which could be harmful to T2DM patients

As noted in the content analysis, despite each artifact mentioning T2DM in some capacity, fewer passive artifacts touch on its purpose of controlling blood sugar levels. By overlooking the primary function of the drug, these artifacts may not provide individuals a clear picture of how this medication works, and how it could benefit them. Additionally, many passive artifacts do not cover some of the more specific risks and benefits of the drug. This is reflected in the lower coverage of the side effects, as well as improved cardiovascular health in these artifacts. Also overlooked is the significance of healthy diet and exercise, as well as the risk of weight regain when Ozempic use is stopped. If an individual with type 2 diabetes is considering Ozempic for treatment and sees multiple artifacts that do not cover these adequately, they may not be able to make a well-informed decision in weighing the risks and benefits of this medication, as well as how to experience the greatest benefit once on it. This could lead to uncertainty if the medication is not working effectively.

When considering the framing of the NPR artifact specifically, further concerns for patients interacting with such sources emerge. By including a testimonial of an individual using

Ozempic who is not confirmed to have T2DM, it could be difficult for someone with diabetes to connect to the story shared, and see what they could also gain from taking the medication. Also, in incorrectly stating that insulin is the reason for weight loss when taking Ozempic, individuals who are already taking insulin may be confused or concerned as to why they have not begun to lose weight. This might affect their reliance on information shared regarding Ozempic, as well as their ability to see the potential benefits it could have for their own health.

With the exclusion of more of the science content in these passive artifacts, the information can come across as more accessible due to concepts being put in simpler terms. These artifacts, however, also leave out key information, and the science is not always complete or accurate. This means that these sources are in fact not as reliable, and explains possible distrust by the public when interacting with sources from social media (Y. Zhao & Zhang, 2017). Even specifically considering the “news finds me” perception, being exposed to sources such as those analyzed here demonstrates how individuals with this mindset can come to be less informed about a topic overall (Gil de Zúñiga et al., 2017). Regarding Ozempic, this likely comes as the result of information that is passed over, or information that is incorrect as seen in both passive artifacts.

The social media post that acts as a partial outlier

Although the generally observed pattern for the passive sources was of information exclusion, some of the information in the Unbiased Science Podcast Instagram post can be extremely useful, and even encouraging, for patients with T2DM. This is likely a reflection of the purpose of the post and of the account in general, as they are not a news organization, but instead look to inform from a scientific basis (*The Unbiased Science Podcast on Instagram*, 2023). By providing important, simplified information on using the medication, its potential side

effects, and providing background on its approval, individuals may feel more confident in conversations with their healthcare providers, and when starting the medication. Through this post, information on the medication can be brought into view for an individual with T2DM previously unaware of it. Following that which was seen in the NPR article, however, is that there was still incorrect or misleading information in this post regarding how Ozempic works, which can in turn lead to misunderstandings by those interacting with the post. This finding demonstrates further how social media is not always a completely trustworthy source of information.

Overall, the passive artifacts (with more emphasis on the news articles, due to the shortness of the social media posts as well as the identified outlier) lacked detail in specific areas that could be beneficial to patients making decisions about the medication. These sources do not provide a strong nor accurate enough overview of the medication, including both the potential risks and benefits, to allow for well-informed decision making when it comes to Ozempic for T2DM treatment.

Passive sources also attempt to deter individuals without metabolic disease from using Ozempic, with varied success and impacts

Despite not covering as much of the relevant science, the content analysis demonstrated that the discourse around Ozempic is much more heavily covered in the passive sources compared to the active sources, especially related to the medication shortage. The NPR article and Unbiased Science Podcast posts specifically discuss the shortage using language attempting to deter individuals from taking Ozempic who do not need it, but with mixed results.

Some of the framing from NPR aiming to scare or shame others away from taking Ozempic could influence the decisions of a T2DM patient. Even if they may benefit in particular

from the medication, they may question their reasons for using it. In contrast, the article's implicit encouragement to take Ozempic for weight loss could lead to non-diabetics taking the drug, furthering shame towards those taking the medication. This can include feeding into views that those taking the medication are "lazy" (Moran, 2023), as its use is discouraged as a quick fix for weight loss. The framing of this article then, leading to both encouragement and discouragement for the use of Ozempic, can cause doubt, shame, or other complications for individuals with T2DM.

With the Instagram post, by focusing on why people should not be taking Ozempic for weight loss, it may come across as shaming those with overweight or obesity for taking the drug. This can leave individuals with metabolic disease confused regarding the benefits of the medication, or frustrated by this shaming. The post, in fact, appeared to have been edited before analysis. The caption begins with a capitalized message reading, "Edit for clarity: this post is responding...to demand for Ozempic for vanity-related weight loss, not clinical reasons". This suggests the original framing of the post was not specific enough in its discouragement of the use of semaglutide medications, and a clarification needed to be made. In returning to the live post, this appears to have been the case as several commenters shared complaints about the wording while stating the importance of Ozempic and Wegovy for individuals with obesity (@unbiasedscipod, 2023). In focusing so much on discouraging off-label use of Ozempic, it was overlooked how the post could be perceived from those taking it who need it for health reasons. It is unclear how much of the caption is as it was originally, and how much was edited as a result of the backlash, so this angle is difficult to fully evaluate, but still worth considering. Before edits were made for the clarification of why they were discouraging Ozempic use for weight loss, this post could have remained extremely frustrating to individuals taking the medication, as they

could have been left to question whether they truly needed it due to the focus on discouraging its use for weight loss.

Hence, while these two artifacts in particular frame the information in a way that attempts to aid individuals with T2DM by emphasizing the need to save Ozempic for its intended uses, this framing may have potentially done more damage overall for this audience in terms of their health and social outcomes.

Active sources cover more of the science in comparison, but some gaps in content and clarity remain

Although there are identified science gaps in the passive information sources, the websites and pharmacy handouts fortunately cover more of those concepts. This is especially important regarding the mention of Ozempic's role in regulating blood glucose levels as well as the side effects, as these important pieces could be front of mind in decision making.

Additionally, these active sources, the websites in particular, more frequently cover the significance of diet and exercise, as well as benefits to cardiovascular health of Ozempic.

On the Medical News Today webpage in particular, the broad coverage of Ozempic helps individuals with T2DM to be able to learn more about it to make decisions regarding their health. By providing an overview of insulin resistance in T2DM at a standard reading level, this can provide an important background piece for individuals newly learning about the condition. Additionally, by describing in more detail how to take the medication, what doses may be prescribed, interactions with other drugs, and side effects, information is provided that may be key to an individual with T2DM benefiting more from the drug. The direct comparison of Ozempic to other similar medications specifically also allows patients to assess their options to consider which might be the best one for them. Not many other sources discuss Rybelsus, the

tablet form of semaglutide, which could be significant for those who are not comfortable with the weekly injection method commonly used for Ozempic administration.

The pharmacy handout, by taking a different approach and screening out extra information about Ozempic, focuses on that which is most important for taking it safely. In turn, it provides some information that could help an individual considering taking Ozempic. By clearly laying out all potential risks of the medication, an individual can make an informed decision regarding the management of their health, and whether they accept the risks and side effects in favour of the benefits they might receive. They can also become more aware of what responsibility they may need to take on in managing their health while using the medication. This can be extremely helpful for individuals taking the medication already to get answers about potential side effects they might be experiencing, and conversations they should have with their healthcare providers.

Within active sources, gaps still remain

Even with the wider coverage of the scientific information in the active sources, it is clear that some gaps remain. The content analysis demonstrated that not all scientific concepts were covered in each source, as well as some of the discourse around Ozempic that could still be significant to consider. The rhetorical analysis further demonstrated how the high reading levels of these sources could make the information contained within them difficult for all audiences to interact with.

The Medical News Today webpage in particular provides a demonstration of how even sources that cover a breadth of information about the medication can retain gaps. This comes as the result of its confusing structure and overall complexity that can make the information difficult to grasp for the average reader. By overwhelming individuals with information, they

may not understand enough to feel they can make decisions or take action related to Ozempic for their health if they are not yet on it. This resource could only be particularly helpful, then, for individuals looking for information from a specific section only, who are perhaps already on Ozempic and simply looking to answer a question or compare their experience.

Additionally, with the focus of the pharmacy handout being safety, some of the more specific benefits of Ozempic are not described, including that of potential weight loss. This means that, while this handout clearly outlines potential reasons not to take Ozempic, it does not become a strong resource for someone looking for more comprehensive information on what some of the major benefits could be as well. Additionally, patients may feel hesitant to take it due to the emphasis of the responsibility of the patient and their healthcare providers to ensure the medication will be safe for them.

From the rhetorical analysis of the two active sources, it is clear that they are more complex, content heavy, and the handout especially does not provide some information that could be helpful in evaluating the benefits of Ozempic. This means that it could be difficult for someone to form a comprehensive picture of what the medication is, and if they could see themselves benefiting from Ozempic, just from reading these two sources alone. This finding aligns with much of the research outlining how websites and handouts are often above a Grade 8 reading level and more difficult to understand for the general public (McInnes & Haglund, 2011; Rolland, 2000).

Overall implications

It is worth noting that the four sources investigated in the rhetorical analysis are not representative of the whole sample considered in the content analysis, nor are they representative of all potential information sources. Additionally, the purpose of each artifact analyzed can vary

and may not be designed for reliable use by T2DM patients. It is still worthwhile, however, to be aware of the drawbacks different types of sources can have, and of the gaps that remain overall in resource availability regarding Ozempic.

In considering the findings from the analysis of these four source types, what emerges is the appearance that not any one of these individual artifacts or sources provides a complete or correct understanding of Ozempic to aid health related decision-making. Furthermore, even when the four informational sources are combined, some gaps remain due to complex language or missing concepts, emphasizing a larger concern. Additionally, some of the framing around the use of Ozempic can have negative health and social consequences for the unintended audiences of that messaging. If the sources that are available to patients do not adequately prepare patients to participate in managing or making informed decisions regarding their own health, this gap needs to be more widely addressed through the creation of patient-targeted, complete resources. With health literacy and understanding of a health condition contributing so strongly to a person's health status (Badarudeen & Sabharwal, 2010), it is important that such resources be provided.

Conclusion

In conclusion, it is clear that there remain gaps in patient information sources related to reliability, clarity, and completeness, as well as consideration of patients in framing certain messages. These gaps can be observed across news articles, social media posts, websites, and pharmacy handouts, leaving patients with T2DM confused, conflicted, or with unanswered questions about Ozempic. This potential confusion is especially significant when Ozempic is being so heavily discussed in the media.

Next steps for research in this area should include investigations into opportunities to fill this gap, in consultation with affected patients. Future research should also consider the applicability of these conclusions to other medications, evaluating whether the observed gaps are a more widespread concern in the Canadian healthcare landscape. Finally, it will be important to address the role of the media when dealing with the sensationalization of medications that provide a significant health benefit to those they are developed for.

This work has highlighted, though, the need for healthcare providers to be aware of this gap in having conversations with T2DM patients about semaglutide. It also highlights for patients that it is important to be aware that sources discussing Ozempic may not always be reliable, including news and social media, and that actively searched sources may still lead to gaps in understanding. Finally, it is important for all audiences to acknowledge the limited reliability of media coverage of medications such as Ozempic, and consider the potential for damaging misinformation as well as stigma associated with metabolic disease.

The findings of this research demonstrate a need for effective, unbiased resources for patients to turn to in order to gain comprehensive understandings of the risks, benefits, and uses of GLP-1RAs like Ozempic. Working to provide these complete and trustworthy information sources on T2DM medications has the potential to improve health literacy, and therefore overall health status, of Canadian T2DM patients.

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Appendix D

Pharmacy Handouts for Content Analysis

Handout 1: Pamphlet

IMPORTANT: HOW TO USE THIS INFORMATION: This is a summary and does NOT have all possible information about this product. This information does not assure that this product is safe, effective, or appropriate for you. This information is not individual medical advice and does not substitute for the advice of your health care professional. Always ask your health care professional for complete information about this product and your specific health needs.

SEMAGLUTIDE (DIABETES) - INJECTION
(SEM-a-GLOO-tide)

COMMON BRAND NAME(S): Ozempic

WARNING: This medication can cause a certain type of thyroid tumor (thyroid C-cell tumors) in rats. It is unknown if this medication can cause similar tumors in humans. Talk with your doctor about the benefits and risks of treatment with this medication. Do not use this medication if you have a personal/family history of a certain type of cancer (medullary thyroid carcinoma) or a certain inherited disease (multiple endocrine neoplasia syndrome type 2 or MEN 2). While using this medication, tell your doctor right away if you notice any signs of thyroid tumors, including an unusual growth or lump in the neck, difficulty swallowing, shortness of breath, unusual/lasting hoarseness.

USES: Semaglutide is used with a proper diet and exercise program to control high blood sugar in people with type 2 diabetes. Controlling high blood sugar helps prevent kidney damage, blindness, nerve problems, loss of limbs, and sexual function problems. Semaglutide is also used in people with type 2 diabetes and heart disease to lower the risk of death from heart attack or stroke.

Semaglutide is similar to a natural hormone in your body (incretin). It works by causing insulin release in response to high blood sugar (such as after a meal) and decreasing the amount of sugar your liver makes.

If you use insulin, semaglutide is not a substitute for insulin treatment.

HOW TO USE: Read the Medication Guide and Instructions For Use provided by your pharmacist before you start using semaglutide and each time you get a refill. Learn all preparation and usage instructions. If you have any questions, ask your doctor or pharmacist.

Before using, check this product visually for particles or discoloration. If either is present, do not use the liquid. Before injecting each dose, clean the injection site with rubbing

alcohol. Change the injection site each week to lessen injury under the skin.

Inject this medication under the skin in the thigh, abdomen, or upper arm as directed by your doctor, usually once every 7 days. The dosage is based on your medical condition and response to treatment. To reduce your risk of side effects, your doctor may direct you to start this medication at a low dose and gradually increase your dose. Follow your doctor's instructions carefully. This medication may be used with or without meals.

Use this medication regularly to get the most benefit from it. Remember to use it every 7 days. If needed, the day of weekly use may be changed as long as the time between two doses is at least 2 days. It may help to mark your calendar with a reminder. Carefully follow the medication treatment plan, meal plan, and exercise program your doctor has recommended.

Learn how to store and discard medical supplies safely.

Tell your doctor if your condition does not get better or if it gets worse (your blood sugar is too high or too low).

SIDE EFFECTS: See also Warning section.

Swelling/redness/itching at the injection site, tiredness, nausea, vomiting, diarrhea, or constipation may occur. Nausea usually lessens as you continue to use semaglutide. If any of these effects last or get worse, tell your doctor or pharmacist promptly.

Remember that this medication has been prescribed because your doctor has judged that the benefit to you is greater than the risk of side effects. Many people using this medication do not have serious side effects.

Tell your doctor right away if you have any serious side effects, including: signs of kidney problems (such as change in the amount of urine), vision changes (such as decreased/blurred vision).

Get medical help right away if you have any very serious side effects, including: signs of pancreas or gallbladder disease (such as nausea/vomiting that doesn't stop, severe stomach/abdominal pain).

Although semaglutide by itself usually does not cause low blood sugar (hypoglycemia), low blood sugar may occur if this drug is prescribed with other diabetes medications. Talk with your doctor or pharmacist about whether the dose(s) of your other diabetes medication(s) needs to be lowered. Drinking large quantities of alcohol, not getting enough calories from food, or doing unusually heavy exercise may also lead to low blood sugar. Symptoms may include sudden sweating, shaking, fast heartbeat, hunger, blurred vision, dizziness, headache, or tingling hands/feet. It is a good habit to carry glucose tablets or gel to treat low blood sugar. If you don't have these reliable forms of glucose, rapidly raise your blood sugar by eating a quick source

of sugar such as table sugar, honey, candy, or drinking a glass of fruit juice or non-diet soda. Check with your doctor or pharmacist to find out what you should do if you miss a meal.

Symptoms of high blood sugar (hyperglycemia) include increased thirst/urination. If these symptoms occur, tell your doctor right away. Your dosage may need to be increased.

A very serious allergic reaction to this drug is rare. However, get medical help right away if you notice any symptoms of a serious allergic reaction, including: rash, itching/swelling (especially of the face/tongue/throat), severe dizziness, trouble breathing.

This is not a complete list of possible side effects. If you notice other effects not listed above, contact your doctor or pharmacist.

In the US -

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088 or at www.fda.gov/medwatch.

In Canada - Call your doctor for medical advice about side effects. You may report side effects to Health Canada at 1-866-234-2345.

PRECAUTIONS: See also Warning section.

Before using semaglutide, tell your doctor or pharmacist if you are allergic to it; or if you have any other allergies. This product may contain inactive ingredients, which can cause allergic reactions or other problems. Talk to your pharmacist for more details.

Before using this medication, tell your doctor or pharmacist your medical history, especially of: a certain eye problem (diabetic retinopathy), a disease of the pancreas (pancreatitis), gallbladder disease, kidney problems, stomach/intestinal disorders (such as gastroparesis, digestion problems).

You may experience blurred vision, dizziness, or drowsiness due to extremely low or high blood sugar. Do not drive, use machinery, or do any activity that requires alertness or clear vision until you are sure you can perform such activities safely.

Limit alcohol while using this medication because it can increase your risk of developing low blood sugar.

It may be harder to control your blood sugar when your body is stressed (such as due to fever, infection, injury, or surgery). Consult your doctor because this may require a change in your treatment plan, medications, or blood sugar testing.

Before having surgery, tell your doctor or dentist about all the products you use (including prescription drugs, nonprescription drugs, and herbal products).

During pregnancy, this medication should be used only when clearly needed. If you are planning pregnancy, become pregnant, or think you may be pregnant, discuss with your doctor right away

the benefits and risks of using this medication during pregnancy. The manufacturer recommends stopping use of this medication 2 months before a planned pregnancy.

Pregnancy may cause or worsen diabetes. Discuss a plan with your doctor for managing your blood sugar while pregnant. Your doctor may change your diabetes treatment during your pregnancy (such as diet and medications including insulin).

It is unknown if this medication passes into breast milk. Consult your doctor before breast-feeding.

DRUG INTERACTIONS: Drug interactions may change how your medications work or increase your risk for serious side effects. This document does not contain all possible drug interactions. Keep a list of all the products you use (including prescription/nonprescription drugs and herbal products) and share it with your doctor and pharmacist. Do not start, stop, or change the dosage of any medicines without your doctor's approval.

Beta-blocker medications (such as metoprolol, propranolol, glaucoma eye drops such as timolol) may prevent the fast/pounding heartbeat you would usually feel when your blood sugar falls too low (hypoglycemia). Other symptoms of low blood sugar, such as dizziness, hunger, or sweating, are not affected by these drugs.

Many drugs can affect your blood sugar, making it harder to control. Before you start, stop, or change any medication, talk with your doctor or pharmacist about how the medication may affect your blood sugar. Check your blood sugar regularly as directed and share the results with your doctor. Tell your doctor right away if you have symptoms of high or low blood sugar. (See also Side Effects section.) Your doctor may need to adjust your diabetes medication, exercise program, or diet.

Do not use this medication with any other product that contains semaglutide.

OVERDOSE: If someone has overdosed and has serious symptoms such as passing out or trouble breathing, call 911. Otherwise, call a poison control center right away. US residents can call their local poison control center at 1-800-222-1222. Canada residents can call a provincial poison control center.

NOTES: Do not share this medication with others.

Attend a diabetes education program to learn more about how to manage your diabetes with medications, diet, exercise, and regular medical exams.

Learn the symptoms of high and low blood sugar and how to treat low blood sugar. Check your blood sugar regularly as directed.

Lab and/or medical tests (such as kidney function, fasting blood glucose, hemoglobin A1c) should be done while you are using this medication. Keep all medical and lab appointments. Consult

your doctor for more details.

MISSED DOSE: If you miss a dose, use it as soon as you remember if it is within 5 days after the missed dose. If it is more than 5 days, skip the missed dose. Use your next dose on your regular day. Do not double the dose to catch up.

STORAGE: Store in the refrigerator. Do not freeze. After first use, store this medication in the refrigerator or at room temperature away from heat and light. Discard 8 weeks after first use. Keep all medications away from children and pets.

Do not flush medications down the toilet or pour them into a drain unless instructed to do so. Properly discard this product when it is expired or no longer needed. Consult your pharmacist or local waste disposal company.

MEDICAL ALERT: Your condition can cause complications in a medical emergency. For information about enrolling in MedicAlert, call 1-888-633-4298 (US) or 1-800-668-1507 (Canada).

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Handout 2: Product Monograph

The patient information section of the Ozempic product monograph can be accessed through the Novo Nordisk website at:

<https://www.novonordisk.ca/content/dam/nncorp/ca/en/products/ozempic-consumer-information.pdf>

Handout 3: Shortened Pamphlet**OZEMPIC 0.25/0.5MG, 2MG/1.5ML, INJ.PEN**

1 / 2

Breakfast

Lunch

Dinner

Bedtime

Common uses

This medication is typically used to control blood sugar levels in people with diabetes. It may also have other uses.

How to use this medication

This product must be injected under the skin (subcutaneously), according to the technique you were shown. Be sure to choose a different injection site each time.

This medication is typically used only once a week. However, your pharmacist may have suggested a different schedule that is more appropriate for you.

Use it regularly and continuously to maintain its beneficial effects.

Dispose of used syringes and needles safely. Your pharmacist can tell you the best way to do this.

Like all individuals with diabetes, you should monitor your blood sugar levels regularly using the appropriate device.

If you forget a dose, contact your pharmacist.

This medication may be taken with or without food.

In order not to cause hypoglycemia, avoid excessive alcohol consumption.

Possible side effects

In addition to its desired action, this medication may cause some side effects, notably:

- it may cause diarrhea or constipation, depending on the person;
- it may cause stomach ache;
- it may cause nausea and vomiting.

Each person may react differently to a treatment. If you think this medication may be causing side effects (including those described here, or others), talk to your health care professional. He or she can help you to determine whether or not the medication is the source of the problem.

Storage information

Keep this product in the refrigerator and do not allow it to freeze. After its first use, keep it at room temperature and discard any unused portion after 8 weeks.

Additional information

Taking this medication during pregnancy may be harmful for the baby. Women of childbearing potential should use an effective contraceptive method during treatment and for several weeks after the end of it. Ask your health care professional for details.

General information

When meeting with any health professional, it is important for you to share the following information:

- Your medical history and allergies (medication, food, or other);
- If you're pregnant or want to become pregnant, or if you're breastfeeding;
- If you use tobacco or cannabis or its derivatives, or if you use recreational drugs;
- The names of all the medications you take, whether you take them regularly or once in a while, including over-the-counter medications, vitamins, and natural health products.

It is also strongly recommended that you keep an up-to-date list of all the medications you take and carry it with you at all times. This could be useful if you have to see a health professional or need emergency care.

Keep all your medications out of the reach of children and pets and return any unused or expired medications to the pharmacy for proper disposal.

This document contains useful information for those taking this medication. It is not intended, in any way, to replace the advice of a trained health professional. For more information, consult the manufacturer's literature, where you will find additional information about uncommon side effects as well as contraindications associated with this product.