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**Anti-obesity Medications Prescribing Measures Utilized by Primary Care Practitioners:  
Scoping Review**

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NURS 9140: Comprehensive Exam

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## **Abstract**

### **Background**

Obesity is a chronic, complex and multifactorial disease with the prevalence increasing in North American adults. Novel AOMs are demonstrating weight loss results comparable to bariatric surgery when used effectively. As the gatekeepers to AOMs, primary care providers can play a key role in obesity management through exploring safe prescribing measures employed in primary care.

### **Objectives**

This review will systematically map the existing literature on prescribing measures for AOMs to determine the extent, range, and nature of literature available on the measures utilized by PCPs when prescribing AOMs in North America.

### **Methods**

One independent reviewer conducted a review using the PRISMA-SCR and JBI methodology. Pubmed, CINAHL, Cochrane, OVID databases were searched between October 9 and December 1. A 10 year date restriction was applied to reflect current practice.

### **Results**

There were 11 sources included in this review of which ten were quantitative studies. These sources identified barriers and facilitators with safe prescribing measures, counselling and uptake of clinical guidelines pertaining to use of AOMs.

### **Conclusions**

This review identified that lack of knowledge and time were common barriers for the safe prescribing, counsel and follow, and utilization of clinical guidelines when using AOMs by PCPs.

## **Anti-obesity Medication Prescribing Measures Employed by Primary Care Practitioners: Scoping Review**

Obesity is a chronic, complex, and multifactorial disease, with the prevalence increasing exponentially as 40% of adults in North America are considered obese (Centers for Disease Control and Prevention [CDC], 2023). In Canada, 1 in 4 adults are classified as obese with 1 in 3 adults being deemed overweight (Health Canada, 2022). The CDC (2022) respectively defines being overweight and obese as a body mass index (BMI) between 25.0-29.9 kg/m<sup>2</sup> and 30 kg/m<sup>2</sup> and above. Estimates suggest that approximately half the adult population will be obese by 2030 (Statistics Canada, 2022). Obesity amplifies the risks of developing type 2 diabetes mellitus (DM II), renal impairment, and several cardiovascular diseases and complications (English & Vallis, 2023). These complications can be ameliorated with a weight loss of 5% or more, with greater losses resulting in more positive health outcomes (Elmarsafi, 2023). The cornerstone of obesity treatment has been comprehensive lifestyle interventions with the adjunct of pharmaceutical interventions only when clinically indicated for a short duration; however, these interventions can result in suboptimal weight loss, and weight regain has been a common issue (Dhillon, 2018). In the past decade, the landscape of anti-obesity medications (AOMs) has changed drastically, with novel agents emerging that demonstrate weight loss results comparable to bariatric surgery (Jeon et al., 2023). These agents offer a revolutionary, non-invasive, comprehensive, and sustainable weight loss choice for managing obesity and its related conditions (Ard et al., 2021).

Primary care settings are initial access points for most patients, providing a pivotal area to address weight loss and management (Rao, 2010). As the gatekeepers to AOMs, Primary Care Practitioners (PCPs) can assess and appropriately identify potential candidates and devise evidence-based anti-obesity treatment (Gudzune et al., 2021; Tham & Young, 2008). Nurse Practitioners (NPs) in particular have the unique opportunity to take the lead in weight management

in primary care. It has been discovered through rigorous research that patients with chronic diseases fare better in the care of NPs compared to physicians (Health Canada, 2006; Canadian Nurses Association [CNA], 2002). NPs evaluate chronic conditions differently than physicians by emphasizing disease prevention, health education and promotion (CNA, 2002). Despite these opportunities, several factors contribute to the under-utilization of AOMs: lack of familiarity or knowledge, historical safety issues, and negative views or attitudes (Kaplan et al., 2018; Oshman et al., 2023). The lack of utilization of AOMs, despite their proposed benefits in managing obesity, warrants further investigation into the prescribing measures of PCPs.

## **Background**

### **Anti-obesity Medications**

Pharmacotherapy for obesity management has a complicated and chequered history constituting promising agents with harmful outcomes (Jeon et al., 2023). Historically, pharmacological agents used in obesity management were diverse, including mitochondrial uncouplers, sympathomimetics, serotonergic agonists, lipase inhibitors, cannabinoid receptor antagonists, and gastrointestinal-derived peptides (Sharma et al., 2019).

As early as the 1970s, anti-obesity regimens included thyroid hormones, diuretics, digitalis, laxatives, and stimulants such as amphetamines (Bray & Purnell, 2022). As efficacious as certain stimulants such as desoxyephedrine and phentermine were, it was often coupled with barbiturates to suppress the side effects (Squadrito et al., 2020). Consequently, these agents resulted in addiction, dependence, and cardiovascular complications. The most common adverse cardiovascular events were pulmonary hypertension, valvular defects, and heart failure. Due to these serious complications, these agents were revoked shortly after their approval from the regulatory bodies (Squadrito et al., 2020). Both Health Canada (2012) and the Food and Drug Administration (FDA, 2007) strongly dissuade the use of established agents such as thyroid

hormones, laxatives, and diuretics for their off-label use of weight regulation. Progress was made in the late 90s with the development of a new anti-obesity agent: orlistat, a pancreatic lipase inhibitor that blocks fat absorption (Rodgers et al., 2012). This agent remains on the market due to its high efficacy and safety profile but is considered to be an undesirable weight loss solution (Haslam, 2016). There is an increased incidence of gastrointestinal disturbances with its use even for a short duration, which can be viewed as socially unacceptable and reduces compliance. The most commonly observed symptoms include steatorrhea, oily discharge, and flatulence which prompt early discontinuation (Rodgers et al., 2012). A dissonant discovery across all these agents is the common inability to achieve mean weight loss greater than 10% of initial body weight despite long-term use at peak doses (Müller et al., 2022). As greater weight loss is achieved, it is typically accompanied by various serious acute or chronic adverse effects (Hsu et al., 2010)

In the past decade, the landscape of anti-obesity medications (AOMs) has changed drastically, with novel agents emerging that demonstrate weight loss results comparable to bariatric surgery (Jeon et al., 2023). These advances include a deeper understanding of molecular gut-brain communication, which continues to inspire the pursuit of the next-generation AOMs capable of safely achieving sizeable and sustained body weight loss (Zevin, 2019). Glucagon-like peptide-1 receptor agonists (GLP-1 Ras) are a newer class of AOMs, with the very first agent receiving market approval in 2005 (Elmarsafi, 2023). Within the class of GLP-1 Ras, distinct differences still exist concerning drug structure, efficacy, dosing, and adverse effects (Dhillon, 2018). Nevertheless, GLP-1 Ras promotes a decrease in body weight by 10-15% of baseline, as well as beneficial effects on blood pressure, HbA1c and lipid profile (Ghusn, 2022). These novel AOMs demonstrate the potential capacity to chronically manage obesity in a non-invasive, cost-effective, and commercially available fashion (Jensterle, 2022).

## **Prescribers**

Primary care settings serve as initial access points into the healthcare system for most patients and as the continuing focal point for all needed healthcare services (Tham, 2008). This provides a pivotal area in which to address weight loss and management (Rao, 2010). The goal of weight management in primary care is to reduce the morbidity and mortality of overweight or obese patients and to improve psychological well-being and social function (Petrin & Kahan, 2015). As the gatekeepers to the healthcare system, primary care practitioners (PCPs) play a crucial role in weight loss and management, health maintenance, and reversing or mitigating obesity-related chronic conditions (Laidlaw et al., 2019). Nurse practitioners (NPs) are key in establishing weight-loss targets, providing motivation and support, and implementing weight-loss programs (Frank, 1998; Hyer, 2019). Kalisch (1972) identifies NPs as leaders to destigmatize obesity while effectively collaborating with the multidisciplinary team and the public to forge positive attitudes and approaches to weight management. With more than 80% of NPs educated in primary care, they can make a significant contribution to tackling the obesity crisis (Hyer, 2019).

Through the use of evidence-based practice, clinical practice guidelines, and policies, PCPs are compelled to identify patients with obesity, inform them of obesity treatment options, and support individuals' choice of and engagement in an individualized treatment plan (Oshman et al., 2023). This scoping review focuses on NPs and physicians as prescribers.

## **Prescribing Guidelines and Safety Measures**

Obesity is a major public health issue, and numerous clinical guidelines have been published to support its management (Bourns & Shiau, 2017). The guidelines have been established by such reputable sources as The Obesity Society, The Endocrine Society, The U.S. Preventive Services Task Force (USPSTF), the World Health Organization, and the Diabetes Association. The aim of the guidelines is to dispel biased beliefs and stigma by depicting obesity as a serious chronic

disease requiring urgent attention (AACE, 2022). The guidelines reflect meaningful advances in the epidemiology, determinants, prevention and treatment of obesity to shift the focus towards patient-centred health outcomes (CPGs, 2022). The consensus amongst all the guidelines is that AOMs should be initiated when an individual's BMI is greater than 27 kg/m<sup>2</sup> with at least one weight-related comorbidity (Nadolsky et al., 2023; USPSTF, 2018; Wharton et al., 2022). The clinical recommendation is that pharmaceutical interventions must function as an adjuvant to comprehensive lifestyle interventions, which include adequate nutritional intake, routine exercise, and behavioral modifications (USPSTF, 2018; Wharton et al., 2022). The most recent guidelines of The Canadian Adult Obesity Clinical Practice Guidelines (CPGs, 2022) and The American Association of Clinical Endocrinologists (AACE, 2022) echo sentiments similar to the other guidelines with general recommendations but without specific prescriptive practices to encourage clinical discretion. PCPs are encouraged to rely on these guidelines as there are no other clear, comprehensive policies, algorithms, tools, or resources on safely prescribing, monitoring and deprescribing AOMs (Rogge & Merrill, 2013). The availability of these clinical guidelines to providers does not necessarily ease the transition of guidelines into practice (Sabol, 2012). These guidelines are nationally approved and widely available for use; however, providers are not required to demonstrate evidence of use.

This review will systematically map the existing literature on prescribing measures for AOMs to determine the extent, range, and nature of literature available on the measures utilized by PCPs when prescribing AOMs in North America. In exploring the prescribing measures, this review will identify the appropriateness of prescribing to ensure effective use, minimize harm, and reduce waste, in addition to providing insights into general prescribing practice and clinical governance.

### **Review Question**



This review aims to address the following research question: What is the extent, range, and nature of literature available regarding the prescribing measures utilized by PCPs when prescribing AOMs in North America? There are three sub-questions:

1. What safety measures are employed when prescribing AOMs by PCPs?
2. What guidelines, practice standards, and/or clinical decision pathways are utilized by PCPs when prescribing and monitoring the use of AOMs?
3. What degree of follow-up and counseling is required with the use of AOMs?

A thorough search of OVID, the Cochrane Database of Systematic Reviews, and JBI Evidence Synthesis was conducted, and no current or underway systematic reviews or scoping reviews on this emerging topic were identified. The absence of reviews on this emerging topic will permit the identification of gaps in the existing literature to aid in planning and commissioning future research.

## **Methods**

### **Protocol and Registration**

The proposed scoping review will be conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). This review will operate in accordance with a published a priori protocol as established by Peters et al. (2020).

### **Eligibility Criteria**

A comprehensive search was initiated, seeking both published and grey literature based on specific criteria. Grey literature, such as conference abstracts, poster presentations, and dissertations, will be eligible.

This review considered literature on PCPs who operate in primary care settings and who can prescribe AOMs. These include advance practice nurses, nurse practitioners, primary

healthcare nurse practitioners, family nurse practitioners, and mid-level providers with graduate education (minimum of a master's level), a protected title, and country-specific regulatory mechanisms for practice. General practitioners (GPs) with graduate education from an approved medical school with at least two years of family medicine residency training will be included. Physician assistants (PAs) with graduate education, minimally a master's level, who practice alongside GPs will be included. The concept of this review is prescribing AOMs for weight loss purposes rather than any other indications or off-label uses. All approved AOMs will be included in the systematic search using both generic and brand names to prevent the omission of any specific agent.

There are restrictions applied to this review to ensure that only pertinent literature is retrieved. With respect to the population of interest, registered pharmacists (RPs) are authorized to prescribe certain medications and are governed by the laws and regulations of the state and province in which they practice; however, AOMs are not included in their list of authorized medications. Therefore, RPs will be excluded from this review. This review will also not consider registered nurses who operate in a primary care setting but who have an undergraduate education only, as they do not have an advanced scope of practice. The concept focuses on AOM use for weight loss purposes thereby the use of AOMs in managing other chronic diseases such as, DMII and fatty liver disease will be excluded. The geography is limited to North America as there is some overlap in Canadian and American practice, and casting a wider net may introduce confounders due to differences in cultures, healthcare systems, and policies. The language limitation will be English or translated to English for feasibility purposes. Literature published before January 2010 will be excluded to target results relevant to a practicing audience and minimize biases associated with outdated practices.

### **Types of Sources**

The information sources selected were based on a consultation with an academic librarian. “Source,” for this scoping review, refers to the included literature. Diverse designs and data were considered for this scoping review to decrease missed sources and biases. Research designs inclusive of quantitative, qualitative, and mixed-method studies will be eligible. Conference abstracts, texts, and opinion papers will also be considered for inclusion.

### **Search Strategy**

An iterative three-step strategy will be employed to identify both published and grey literature. PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, OVID MEDLINE, Cochrane Central Register of Controlled Trials, and Cochrane Database of Systematic Reviews were the electronic databases included in the comprehensive literature search. An initial limited search of two online databases, PubMed and OVID, that are relevant to the topic of interest was conducted. The search was constructed around three terms: “prescribing,” “AOMs,” and “PCPs,” followed by an analysis of the text words in the title and abstracts of retrieved articles and of the index terms used to describe the articles. The second step consisted of a search that involved using all identified keywords and index terms. Each keyword string, medical subject heading (MeSH) term, and truncated word was coupled in several groupings using Boolean operators “and/or”: “medication therapy management or prescriptions” and “overweight or obes\* or weight loss” and “physician or physician assistant or nurse practitioner or primary care.” After these strategies were completed, a university librarian was consulted to ensure the search was rigorous. The searches were conducted between October 9 and October 24. The final search strategy for both PubMed and OVID is presented in Appendices A and B. The keyword strings were reused for subsequent searches but adapted for each respective database. The language and date limitations were applied at the end of each search. Any article published from January 2010 to the present time will be included in the review. The reference lists of all included sources

of evidence were screened for additional studies. The last searches were undertaken between November 4 and December 1.

### **Selecting the Evidence**

Following the extensive search, all identified studies will be collated and uploaded to Zotero for importing and management purposes. Once uploaded, a careful screening will aid in removing all duplicates. All the titles and abstracts will be screened by a single reviewer against the inclusion criteria and purpose statement initially established for this review. The eligible articles will be sought out for retrieval. Potentially relevant articles will be retrieved in full, and their citation details will be imported into Zotero. The results of the search and the study inclusion process will be reported in full in the scoping review and presented in a PRISMA flow diagram.

### **Data Extraction**

Data will be extracted from the articles by one independent reviewer for inclusion in the scoping review using a data extraction tool as recommended by the JBI methodology for scoping reviews (Peters et al., 2020). The JBI data extraction table is in Appendix D, which includes rows for the following datasets: author, purpose, location/population, methods, analysis, key findings, and literature source. The systematic process employed to identify, screen, and incorporate viable articles is illustrated with a PRISMA flow diagram in Appendix C. The extracted data and findings are depicted in a tabular format in a fashion that aligns with the purpose of this scoping review. The extracted data are also presented in tabular and diagrammatic format. A narrative summary accompanies the tabulated results.

### **Results**

A total of 187 results were generated through database searches, and an additional 15 records were retrieved via other methods. After the removal of 15 duplicates, 187 records were screened based on title and abstract, and 145 were excluded. There were 42 reports sought for

retrieval and full analysis, with seven that were unretrievable despite requesting permission and consulting an academic librarian. There were 35 reports remaining to be assessed further for eligibility, with a total of 24 being excluded. There were several reasons for exclusion: studies on laboratory animals (n=8), the use of AOMs as anti-hyperglycemic agents on diabetics (n=10), and off-label use of AOMs for the management of chronic diseases such as fatty liver disease (n=6). A total of 11 articles were retained for data extraction and were included in this review. The search results and study selection are depicted in the PRISMA flow chart in Appendix C.

### **Source Characteristics**

The characteristics of the 11 included reports for this scoping review can be found in a tabular format in Appendix D. The included sources were published between 2016 and 2023. The majority (n=8) of the sources were from America, with three documented sources from Canada (n=3). The sources were primarily from a primary care setting (n=8). Two sources were from academic centers, with another one focusing on specialty primary care areas such as internal medicine, family medicine, and women's health. There were ten quantitative studies with a single mixed method study included in this scoping review. The quantitative studies used surveys that were conducted either in-person, online, or by mail to further explore measures utilized by PCPs when prescribing AOMs. The mixed-method study was executed in two phases: open-ended survey questions and semi-structured interviews. The survey questions provided insights into provider characteristics, clinical expertise and current practice patterns and barriers. The interview followed to further evaluate PCPs' attitudes towards the use of AOMs and clinical guidelines in the management of obesity. The 11 sources were analyzed for similarities and grouped by key findings.

### **Synthesis of Results**

The findings are presented in three sections as answers to the three scoping review questions.

### ***Safety Measures for Prescribing AOMs***

The overarching theme identified by examining the literature was that prescribing AOMs in a primary care setting is challenging. The contributing factors were lack of knowledge and familiarity, safety concerns and perceived low efficacy (Menon et al., 2023; Oshman et al., 2023; Sharma et al., 2019; Squadrito et al., 2020). Consequently, this has materialized in the under-prescribing and under-utilization of AOMs despite their clinical indications (Claridy et al., 2021; Granara, 2017; Fadel et al., 2023). Sources included in this review reported that increased knowledge and education in obesity management resulted in improvement in clinical practice (Claridy et al., 2021; Sharma et al., 2019; Simon & Lahiri, 2018). Higher self-reported knowledge among PCPs was associated with more frequent weight loss drug recommendations and prescribing (Granara, 2017). This prevented delay in treatment until patients reached a high level of morbidity and developed complications or concomitant conditions, which was common practice amongst non-prescribers (Claridy et al., 2021). Multiple sources indicated that their primary sources of knowledge were obtained from pharmaceutical companies or clinical resources (Claridy et al., 2021; Fadel et al., 2023; Granara, 2017; Kahan et al., 2023; Oshman et al., 2023). This cumulated in a lack of familiarity with newer AOMs and confidence in obesity management (Sharma et al., 2019; Simon & Lahiri, 2018). Prescribers conveyed reluctance to prescribe AOMs until long-term evidence was available depicting the safety of its use (Granara, 2017; Menon et al., 2023; Simon & Lahiri et al., 2018; Squadrito et al., 2020). The studies cited historical setbacks in which regulatory bodies removed agents from the market due to post-approval safety concerns. This reservation is demonstrated by PCPs prescribing older AOMs at higher rates than the newer classes (Granara, 2017; Menon et al., 2023). Misperceptions that older classes were safer to prescribe due to familiarity with their safety profile, mechanism of action and management strategies were consistent findings in this review (Claridy et al., 2021; Fadel et al., 2023; Granara, 2017; Kahan et

al., 2023; Oshman et al., 2023). The efficacy of AOMs has consistently been challenged in the sources, with prescribers perceiving it to be unsustainable and transient (Menon et al., 2023; Oshman et al., 2023; Sharma et al., 2019; Squadrito et al., 2020).

### ***Guidelines for Prescribing AOMs***

This review discovered a lack of adherence and utilization of comprehensive clinical guidelines impacting the application of evidence-based practice. Numerous barriers were identified, with the recurring themes being time constraints, lack of educational opportunities and adherence to current clinical practices.

All of the eleven sources included in this review conceded that the pervasive issue to optimal obesity management was time (Claridy et al., 2021; Fadel et al., 2023; Granara, 2017; Kahan et al., 2023; Menon et al., 2023; Oshman et al., 2023; Sharma et al., 2019; Simon & Lahiri, 2018; Smith et al., 2023; Squadrito et al., 2020; Thomas et al., 2016). The time required to utilize current clinical guidelines and become familiarized with new obesity treatments was allotted to clinical demands across all sources (Claridy et al., 2021; Fadel et al., 2023; Granara, 2017; Kahan et al., 2023; Menon et al., 2023; Oshman et al., 2023; Sharma et al., 2019; Simon & Lahiri, 2018; Smith et al., 2023; Squadrito et al., 2020; Thomas et al., 2016). Competing clinical demands such as a high volume of complex patients, prioritizing acute episodes, and overwhelming administrative tasks conflicted with knowledge advancement (Fadel et al., 2023; Granara, 2017; Kahan et al., 2023). Failure to apply clinical guidelines to practice was attributed to insufficient time to retrieve, summarize and comprehend the lengthy material (Claridy et al., 2021; Thomas et al., 2016). Several sources recommended dedicating educational time to obesity management training with financial remuneration and incentives (Claridy et al., 2021; Fadel et al., 2023; Kahan et al., 2023; Menon et al., 2023; Oshman et al., 2023; Sharma et al., 2019). Notably, NPs were less

likely to seek financial compensation to pursue educational opportunities and advancements (Granara, 2017).

Common facilitators cited for delivering evidence-based obesity management were educational opportunities such as educational sessions, conferences, workshops, and webinars (Fadel et al., 2023; Granara, 2017; Kahan et al., 2023). These types of initiatives were identified as providing congruency between current practice and guideline recommendations. Simon & Lahiri (2018) presented survey results showing that nearly 79% of PCPs felt adequate educational opportunities would enhance their knowledge of current obesity management recommendations, which in turn would increase the prescribing of AOMs.

A common deterrent acknowledged in many sources for the utilization of clinical guidelines to provide optimal obesity management was adherence to current clinical practice (Claridy et al., 2021; Fadel et al., 2023; Granara, 2017; Kahan et al., 2023; Oshman et al., 2023). An inability to overcome the inertia of entrenched practices is impeding the uptake of current clinical guidelines. In a few sources, PCPs reported relying on clinical judgement and expertise over clinical guidelines due to the perception that this knowledge was comparable in nature, if not superior (Menon et al., 2023; Oshman et al., 2023; Sharma et al., 2019; Squadrito et al., 2020). A belief that some of the guidelines were outdated or non-pragmatic appeared to favour clinical resources and expertise over their recommendation (Claridy et al., 2021; Thomas et al., 2016).

### ***Follow-up and Counseling Required With AOM***

This review identified that counselling on obesity management was provided in an infrequent, inconsistent and sub-optimal manner (Fadel et al., 2023; Granara, 2017; Oshman et al., 2018, Squadrito et al., 2020). The lack of counselling diminished both the opportunity and need for follow-up (Oshman et al., 2018). The factors hindering optimal counselling on obesity management were identified as the prioritization of chronic diseases and a tendency to refer to



specialists. In majority of the sources, PCPs conceded that obesity is a complex chronic disease requiring a multi-faceted holistic approach to management (Claridy et al., 2021; Fadel et al., 2023; Granara, 2017; Kahan et al., 2023; Menon et al., 2023; Simon & Lahiri, 2018; Smith et al., 2023). A causality between obesity and the development of other chronic diseases was further acknowledged, but greater emphasis was placed on treating the latter (Claridy et al., 2021; Fadel et al., 2023; Granara, 2017; Kahan et al., 2023; Menon et al., 2023; Simon & Lahiri, 2018; Smith et al., 2023; Squadrito et al., 2020; Thomas et al., 2016). When counselling on obesity management was provided, it was often targeted toward the elderly, the morbidly obese, and those with concomitant conditions (Simon & Lahiri, 2018; Smith et al., 2023.) Granara (2017) highlighted that NPs were twice as likely to provide counselling on obesity compared to GPs and PAs. These discrepancies in practices were attributed to differences in training and competencies by provider type (Granara, 2017).

The in-depth counselling on obesity management is further impeded by the PCPs' tendencies to refer to obesity specialists rather than relying on their own professional expertise (Fadel et al., 2023; Granara, 2017; Kahan et al., 2023). Referral practices were tailored based on patient comorbidities, preferences and length of wait time (Claridy et al., 2021; Sharma et al., 2021; Squadrito et al., 2020). Due to the quicker response rates, bariatric and community-based weight loss programs were often utilized when alternative resources were not available (Claridy et al., 2021; Sharma et al., 2021). PCPs commonly referred patients for nutritional counseling with registered dietitians who recommended lifestyle management strategies, even though the PCPs acknowledged the variable effectiveness of these treatment options (Claridy et al., 2021; Fadel et al., 2023; Granara, 2017; Kahan et al., 2023). PCPs deferred to the medical expertise of Endocrinologists for pharmacotherapy and lifestyle management across a majority of the sources (Claridy et al., 2021; Fadel et al., 2023; Granara, 2017; Kahan et al., 2023; Menon et al., 2023;

Oshman et al., 2023; Simon & Lahiri, 2018; Smith et al., 2023; Squadrito et al., 2020; Thomas et al., 2016). Endocrinologists were perceived as being better equipped and more familiar with the appropriate prescribing, counselling and follow-up required with the use of AOMs (Oshman et al., 2023; Simon & Lahiri, 2018; Smith et al., 2023).

## **Discussion**

### **Summary of Evidence**

This scoping review identified that diverse literature pertaining to the prescribing measures utilized by PCPs when prescribing AOMs is sparse at best. There were only 11 sources of pertinent literature that met the eligibility criteria, but the findings were multi-dimensional, highlighting the complexity of the topic. Most of the literature were quantitative studies, but they included both primary and secondary sources. A mixed-method study was included in this review, which conceptually and analytically integrated qualitative data.

The findings identified barriers and facilitators to safe prescribing, effective counselling and follow-up, and the proper utilization of clinical guidelines. The key barriers that were highlighted were lack of knowledge and time for which there were clear facilitators. The consensus amongst the majority of the sources is that PCPs may lack the knowledge and skills to effectively and consistently diagnose, counsel and treat obesity in primary care (Fadel et al., 2023; Granara, 2017; Kahan et al., 2023; Menon et al., 2023; Oshman et al., 2023; Sharma et al., 2019; Simon & Lahiri, 2018; Smith et al., 2023; Squadrito et al., 2020). Under-utilization of pharmacotherapy suggests that PCPs may not have sufficient knowledge about medication safety profiles and efficacy (Claridy et al., 2021; Granara, 2017; Fadel et al., 2023). Inadequate obesity training and education was traced back to the PCPs' undergraduate studies, with even fewer opportunities identified in the workforce (Oshman et al., 2023; Simon & Lahiri, 2018; Smith et al., 2023).

Standardizing obesity education across the disciplines is a strategy to facilitate appropriate obesity management (Oshman et al., 2023).

Insufficient clinical time to address the complexities of obesity was another identifiable barrier. Clinical demands created conflict with the time required to adequately diagnose, counsel and initiate treatment for obesity (Kahan et al., 2023). The majority of the sources conceded that time was allotted for clinical demands rather than the utilization of clinical guidelines or educational opportunities (Fadel et al., 2023; Granara, 2017; Kahan et al., 2023). PCPs cited systemic and structural barriers that fostered shorter visits, higher patient volume, and lack of providers (Sharma et al., 2019; Simon & Lahiri, 2018; Smith et al., 2023; Squadrito et al., 2020). One of the facilitators highlighted was to address how visits were coded in primary care to allot longer clinical time for chronic diseases such as obesity (Granara, 2017).

To strengthen prescribing measures in primary care, the findings of this scoping review will be tailored to the appropriate knowledge users, such as healthcare providers and policymakers. Opportunities to improve obesity management in primary care settings include educational initiatives, team-based care models, and policy changes to incentivize obesity treatment (Oshman et al., 2023). Primary care clinics or health systems should be encouraged to identify PCPs with specific interests in obesity medicine and support their training and certification through designated boards (Thomas et al., 2020). The American Board of Obesity Medicine (ABOM) offer extensive obesity training which can be facilitated by reimbursing costs and reducing the clinical effort to allow for study and board examination (Oshman et al., 2023; Thomas et al., 2020). The integration of an obesity medicine expert within primary care teams can provide a comprehensive obesity assessment with personalized treatment plan recommendations along while serving as a resource for other providers (Thomas et al., 2020).

## **Limitations**

To this authors' knowledge, this is the first scoping review investigating measures utilized by PCPs when prescribing AOMs in North America. This scoping review used rigorous and transparent methods throughout the entire process. It followed an established protocol that permitted expert knowledge synthesis and translation. To ensure a broad search of the literature, the search strategy included four electronic academic databases, backward citations, one internet search engine, the websites of relevant organizations, and the snowball technique. Sources in a language other than English and those available before the year 2010 were excluded, limiting the review of the literature to the last 10 years to reflect current practices and the evolution of AOMs over the years. There was a risk of selection bias if this author failed to identify all available published and unpublished sources pertinent to the topic. It is imperative to note that sources included in this review are primarily US-based, with only three based in Canada. This inadvertently introduced geographic bias by limiting relevant findings pertinent to Canadian practice. Additionally, the Canada-specific evidence that does exist appears to be physician-focused, which isn't an accurate reflection of primary care practice as a whole. This evidence negates the distinct differences in prescribing practices between NPs and GPs despite some similarities in their scope of practice. This prompts the need for further robust, experimental, anecdotal, or empirical evidence that can adequately inform practice surrounding this topic. This scoping review was an enormous undertaking; however, the results are anticipated to remain current transitorily. A new AOM, Mounjaro, was approved in late November 2023 since initiating this review, prompting the revising of the search strategy to reflect the newest agent.

## **Conclusion**

This scoping review explored the literature available on prescribing measures utilized by PCPs when prescribing AOMs in primary care. It revealed several existing barriers that appear to

hinder the measures utilized by PCPs when prescribing AOMs. The overarching issues identified were knowledge deficit and time constraints, which were discussed across all sources. PCPs expressed that they did not possess the knowledge required to appropriately counsel, prescribe, and monitor the use of AOMs (Menon et al., 2023; Oshman et al., 2023; Sharma et al., 2019; Squadrito et al., 2020). This knowledge deficit resulted in the under-utilization of AOMs due to concerns of their safety and efficacy (Claridy et al., 2021; Granara, 2017; Fadel et al., 2023). Historical safety concerns with the use of AOMs encouraged PCPs to favour older agents despite the superiority of newer agents specified in emerging literature (Avery et al., 2014; Apovian et al., 2015). PCPs did express explicit interest in continuing education and training to improve their knowledge and skills in obesity management (Granara, 2017; Menon et al., 2023). Knowledge advancement, delivered in both informal or formal modalities, was identified as a helpful strategy that can help align current practices with clinical recommendations and guidelines (Fadel et al., 2023; Granara, 2017; Kahan et al., 2023). Time was a constant and pervasive issue identified across all the sources that impacted all facets of obesity management and knowledge attainment. PCPs reported lack of time to assess, diagnose, counsel, and treat obesity. Competing clinical demands infringed on the time dedicated to remaining current with the evolving guidelines on obesity management (Fadel et al., 2023; Granara, 2017; Kahan et al., 2023). The sources demonstrated an increased tendency to refer to obesity specialists due to the perception that weight loss experts possess the time and skills needed to address the complexities of obesity management (Fadel et al., 2023; Granara, 2017; Kahan et al., 2023).

PCPs are encouraged to play key roles in helping patients with obesity lose weight and prevent, control, and reverse obesity-related chronic conditions (Petrin & Kahan, 2015). Providers must gain confidence in prescribing AOMs to combat the obesity epidemic (Rao, 2010). Addressing the issues of obese patients and the obesity crisis requires a multi-faceted approach that

includes increased obesity management education, community support and services, review of institutional practices, and increased funding for obesity research (Jansen et al., 2015). Narrowing the research gap in this area is advantageous for two reasons: it can improve patients' quality of life and reduce the strain on PCPs who help patients managing obesity. Significant knowledge can be gained by investigating the prescribing measures of providers with any disease (English & Vallis, 2023). AOMs are relatively novel in the management of obesity, and this scoping review highlights the need for further research into the prescribing habits of PCPs who work to address this issue.

### **Implications for Research**

The objective of this scoping review was to map the existing literature on prescribing measures for AOMs to determine the measures utilized by PCPs when prescribing AOMs in North America. There was a scarcity of literature discovered on the prescribing measures utilized by PCPs which impedes the feasibility of devising a focused systematic review. In the future, robust single studies that are qualitative or mixed-methods in nature is needed to provide greater insights into the attitudes, beliefs and behavioural patterns of prescribers. The literature retrieved were predominantly American with a glaring omission of Canadian studies. This prompts the need for Canadian-specific studies and sources. There may be overlap in healthcare practices in North America; however, there are specific nuances and intricacies of Canadian healthcare practices for which to account. Furthermore, NPs were not adequately represented in the literature despite their presence in primary care thereby more research in NP prescribing measures would be beneficial in advancing clinical practice. As such, research in the area of NP prescribing is essential to inform NP educational programs, expound on the resources available to NPs when prescribing AOMs, and provide foundational information to NP regulatory bodies for policy development. Lack of standard conceptual and operational definitions of prescribing measures limits its research therefore, greater

conceptual clarity is warranted. This could be achieved by a concept analysis or formal concept mapping. Ultimately, given the promising reports on the use of AOMs on weight loss (Rogge & Merrill, 2013), the end goal is the formation of best practices around the safe prescribing of AOMs to mitigate negative consequences of misuse or delay in treatment.

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## Appendix A

### Search Strategy

Ovid MEDLINE search <1946 to December 1, 2023>

#	Query	Results from 1 Dec 2023
1	(semaglutide or ozempic or wegovy or rybelsus or liraglutide or saxenda or wellbutrin or bupropion or naltrexone or orlistat or Xenical or Mounjaro or Tirzepatide).ti,ab,kw.	18,868
2	exp Glucagon-Like Peptide 1/	11,191
3	1 or 2	27,450
4	(overweight or obes* or "weight loss").ti,ab,kw.	483,151
5	exp overweight/ or weight loss/	294,341
6	4 or 5	536,609
7	(prescri* or "follow up" or maintenance).ti,ab,kw.	1,777,358
8	medication therapy management/ or exp prescriptions/	44,451
9	7 or 8	1,791,337
10	(doctor* or MD or "general practitioner*" or GP or physician* or "physician assistant" or PA or "nurse practitioner*" or NP or FNP or PHCNP or	923,333



	"advanced practice nurs*" or APRN or "mid-level provider*" or "mid-level provider*").ti,ab,kw.	
11	physician assistants/ or exp nurse practitioners/ or nurse clinicians/ or physicians/ or general practitioners/ or physicians, family/ or physicians, primary care/	163,869
12	10 or 11	982,135
13	3 and 6 and 9 and 12	56

## Appendix B

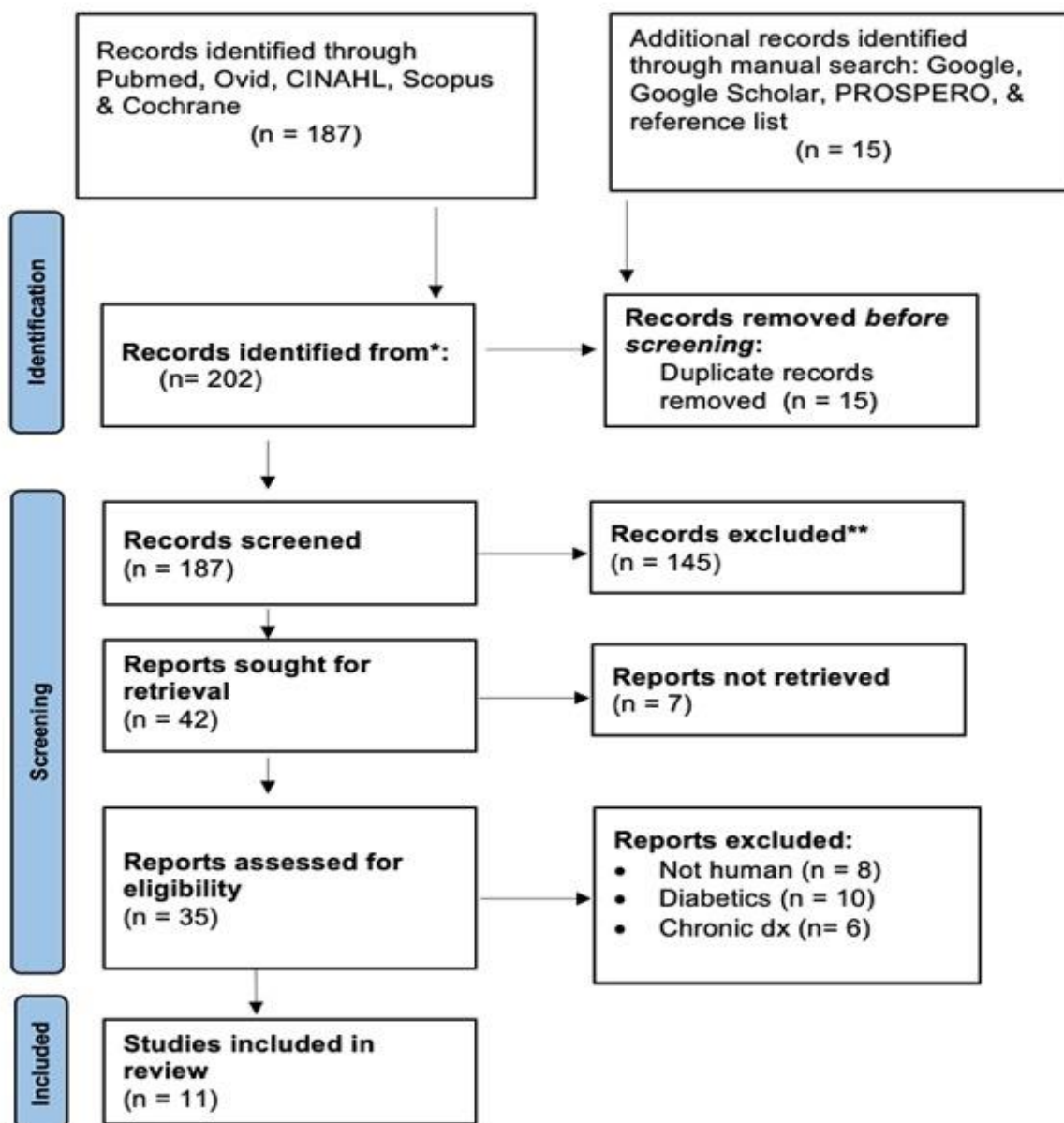
### Search Strategy

PubMed search < Tue Nov 24 19:04:20 2023 >

#Query	Results from Nov 24
1 semaglutide or ozempic or wegovy or rybelsus or liraglutide or saxenda or wellbutrin or bupropion or naltrexone or orlistat or Xenical or Mounjaro or Tirzepatide	817
2 exp Overweight/ or weight loss/	289,194
3 (overweight or obes* or "weight loss" [Mesh])	408,253
4 (Drug Prescription [Mesh] or prescribing [Mesh])	461,237
5 "Physicians, Primary Care"[Majr] OR "Nurse Practitioners"[Mesh] OR "Family Nurse Practitioners"[Mesh] OR "Physician Assistants"[Majr]	291, 348
6 2 or 3	118, 359
7 1 and 4 and 5 and 6	98

## Appendix C

## Prisma Chart



## Appendix D

Table 1

### Literature Regarding Measures Utilized by PCPs when Prescribing AOMs in North

#### America: Data Synthesis

Author & Year	Purpose	Location and Population	Methods	Analysis	Key Findings	Literature source
Claridy et al. (2021)	The aim is to examine the use of pharmacotherapy for obesity management in the United States from 2011 to 2016	America; physician office visits (2011-2016)	Data were obtained during 6 years, from the National Ambulatory Medical Care survey. <b>3 types of visits were identified:</b> patients with obesity who received AOMs, patients with obesity and who did not receive AOMs, average weight patient who received AOMs.	<ul style="list-style-type: none"> <li>• The <math>\chi^2</math> test was applied to compare characteristics across each type of visit.</li> <li>• Logistic regression analyses to predict odds of AOMs prescribing, obesity diagnosis, or a BMI of <math>&gt; 30 \text{ kg/m}^2</math></li> </ul>	<ul style="list-style-type: none"> <li>• GPs expressed concerns about the safety and efficacy of AOMs use citing historical issues</li> <li>• A slight spike in counselling in the use of AOMs was recorded but prescribing was reserved for the elderly or the morbidly obese</li> <li>• 90% of physicians referred patients to specialists (Endocrinologist, bariatric clinic etc) over prescribing AOMs</li> <li>• lack of time, education and training endorsed with info provided by pharmaceutical reps</li> </ul>	Quantitative (secondary analysis)
Fadel et al. (2023)	The aim is to examine the perceptions regarding the use of AOMs amongst primary	America; 341 PCPs	24-question online survey	<ul style="list-style-type: none"> <li>• Likert items were analyzed as continuous variables by an independent t-test</li> </ul>	<ul style="list-style-type: none"> <li>• 90% of PCPs believed AOMs were effective, only 65% believed that the risks outweighed the benefits, and about</li> </ul>	Quantitative

	care practitioners (PCPs)			<ul style="list-style-type: none"> <li>• x(2)-test was used for comparison of proportions</li> </ul>	<p>52% deferred to specialists for management such as Endocrinologists</p> <ul style="list-style-type: none"> <li>• 24% of PCPs provided counselling on weight loss despite 93% indicating that this is important</li> <li>• Lack of time to utilize updated clinical guidelines was reported with information provided by pharmaceutical reps identified</li> </ul>	
Granara (2017)	The aim is to identify PCPs' practice patterns, attitudes, barriers, and facilitators for prescribing weight loss medications	Canada; 94 PCPs; 46 MDs, 43 NPs, 5 PAs	Descriptive study; use of online surveys	<ul style="list-style-type: none"> <li>• Pearson chi-square tests were computed to determine difference in demographics</li> <li>• McNemar tests were used to compare the recommended use of each weight loss medication to its effectiveness</li> <li>• p-value of &lt;0.05, two-sided, was established as statistically significant</li> </ul>	<ul style="list-style-type: none"> <li>• 58% of all PCPs reported "negative" and "very negative" views with the use of AOMs</li> <li>• 4% felt that AOMs were safe but restricted to the use of older agents</li> <li>• Barriers identified were fear of adverse events and drug interactions</li> <li>• 73% reported lack of knowledge, time and comfort with prescribing AOMs</li> </ul>	Quantitative
Kahan et al. (2023)	The aim is to examine the perceptions of PCPs concerning obesity treatment to identify barriers to AOM utilization	America; 504 PCPs, 50 NPs	Cross-sectional study; web-based survey conducted in May-December 2022	N/A	<ul style="list-style-type: none"> <li>• GPs were less likely to prescribe AOMs than NPs</li> <li>• GPs more commonly cited lack of training, familiarity and concerns regarding remuneration as barriers to proper</li> </ul>	Quantitative

					<p>obesity management</p> <ul style="list-style-type: none"> <li>• 6% of respondents considered medical guidelines as effective for treating obesity but lacked the time to utilize it</li> <li>• 58% of respondents endorsed referral to specialists</li> </ul>	
Menon et al. (2023)	The aim is to identify practices in the evaluation and management of obesity by PCPs	America; 110 PCPs in primary care centers; 71 GPs 14 Pas 25 NPs	Descriptive study; 21 questionnaire-based survey	N/A	<ul style="list-style-type: none"> <li>• 64% of respondents reported never prescribing AOMs for management of obesity due to safety concerns and lack of familiarity</li> <li>• 73% of respondents reported adhering to guidelines for management of chronic diseases rather than obesity management despite causality between obesity and comorbidities</li> </ul>	Quantitative
Oshman et al. (2023)	This study aims to understand PCPs' perspectives on obesity treatment barriers and opportunities to overcome them	America; 350 PCPs; Family medicine, internal medicine, Med-Peds	Survey followed by semi-structured interviews	<ul style="list-style-type: none"> <li>• Descriptive statistical analysis 5-point Likert scale 4-point frequency scale</li> <li>• Dichotomous measures to indicate positive, neutral or negative responses</li> <li>• Qualitative codes were mapped to survey domains: practice patterns, barriers to obesity</li> </ul>	<ul style="list-style-type: none"> <li>• 29% of respondents reported prescribing AOMs with higher preferences on referrals or lifestyle interventions</li> <li>• &lt; 10 % used evidence-based guidelines to inform obesity treatment decisions reporting lack of time</li> </ul>	Mixed-method

				treatment and referral and potential opportunity to overcome barriers Qualitative analysis using NVIVO-12	<ul style="list-style-type: none"> <li>• 54% of respondents perceived existing clinical resources along with professional experience as adequate for obesity management</li> </ul>	
Sharma et al. (2019)	The aim is to investigate the perceptions, attitudes and perceived barriers towards obesity management among Canadian PCPs	Canada; 395 PCPs 41 obesity specialists 354 Non-obesity specialists	21 close-ended survey questions	<ul style="list-style-type: none"> <li>• Descriptive analysis</li> <li>• frequencies and percentages for categorical outcomes</li> <li>• Means or medians for continuous outcomes</li> </ul>	<ul style="list-style-type: none"> <li>• Inconsistent adherence to clinical guidelines were identified</li> <li>• Consensus in the believe that obesity is a chronic condition but divisiveness in management approaches identified with majority (73%) favouring lifestyle management</li> <li>• Higher preference (59%) for referring to specialists reported</li> <li>• Counselling and follow-up focused on lifestyle measures</li> </ul>	Quantitative
Simon & Lahiri (2018)	The aim is to identify recommendations and barriers in obesity management in a multicenter academic health system	America; 111 PCPs; 73 Family physicians, 24 PAs, 14 NPs	26-question online survey	Spearman rank correlation coefficient	<ul style="list-style-type: none"> <li>• Of the 111 respondents, 43% reported confidence in prescribing AOMs</li> <li>• 79% of PCPs felt adequate educational opportunities would enhance their knowledge of current obesity management recommendations,</li> </ul>	Quantitative

					<p>which in turn would increase the prescribing of AOMs</p> <ul style="list-style-type: none"> <li>• Barriers cited were lack of training and education, safety concerns, and perceived lack of efficacy</li> <li>• 90% of respondents reported awareness of the existence of different guidelines but felt like they received very little education in obesity management</li> </ul>	
Smith et al. (2023)	The aim is to assess the current practices and beliefs of PCPs and NPs/PAs regarding obesity counseling and management	America; 1000 PCPs; 214 NP/PAs	Descriptive study; 102 open-ended questions	N/A	<ul style="list-style-type: none"> <li>• 67% of PCPs indicated that they did not prescribe AOMs</li> <li>• Barriers to prescribing was identified as lack of knowledge, training and familiarity with agents</li> <li>• Lack of time was identified for minimal guideline use</li> <li>• Prescribers were more likely to refer than to provide counselling on obesity management and follow-up on AOMs use</li> </ul>	Quantitative
Squadrito et al. (2023)	The aim of the study was to investigate the management of obesity and the	Canada; 1301 patients managed by 8 GPs;	An observational retrospective study	<ul style="list-style-type: none"> <li>• Descriptive analysis to assess demographics</li> <li>• 95% confidence interval were</li> </ul>	<ul style="list-style-type: none"> <li>• A low adherence to the guidelines for obesity management due to length and</li> </ul>	Quantitative



	prescriptive attitude of AOMs in a general practice setting		conducted in collaboration with 8 GPs through the Department of Clinical & Experimental Medicine	evaluated for the categorical variables, <ul style="list-style-type: none"> <li>• The Mann–Whitney U test for independent sample was applied for continuous variables</li> <li>• Two-tailed Pearson chi-squared test for categorical variables</li> <li>• <math>p &lt; 0.05</math> was achieved</li> </ul>	perceived suboptimal content <ul style="list-style-type: none"> <li>• AOMs were underutilized due to concerns regarding safety and efficacy</li> <li>• GPs were more likely to counsel patients on AOMs in the presence of chronic diseases or morbid obesity with (at least) one comorbidity i.e. DMII</li> </ul>	
Thomas et al. (2016)	The aim is to examine the adoption of anti-obesity among prescribers in the United States	America; 118 family physicians audited	A retrospective analysis of deidentified data retrieved from 2012-2015 from the IMS Health databases.	<ul style="list-style-type: none"> <li>• Univariate linear regressions to model prescriptions</li> <li>• 95% CI for the mean change in prescriptions dispensed per month</li> </ul>	<ul style="list-style-type: none"> <li>• A low ratio of prescribing of new AOMs agents comparatively to older AOMs were recorded</li> <li>• Reduced rates of renewal or long-term prescribing of AOMs (~ 3 months use on average)</li> <li>• The trends demonstrated a cyclical nadir in December followed by a dramatic uptick prior to Spring inferring that AOMs prescribing may be patient driven</li> </ul>	Quantitative

## **Appendix E**

### Author Guidelines

#### **TITLE PAGE:**

The title page is to be submitted separately from all other files and must include the following as applicable:

A brief informative title (maximum 20 words) containing as many of the keywords for your submission as possible.

- a. Do not use country names or abbreviations in the title.
  
- b. Craft your title with great thought and care for readability and maximum search discoverability

#### **MAIN TEXT FILE:**

The Journal uses a double-blind peer review process. ensure that all identifying information such as author names and affiliations, acknowledgements or explicit mentions of author institution in the text are on the title page and not in the main text file.

#### **Structured Abstract Format:**

- a. 300 words maximum.
  
- b. No abbreviations.
  
- c. Do not report p values, confidence intervals and other statistical parameters.

#### **INCLUDE THE FOLLOWING HEADERS IN ABSTRACTS:**

Aim(s) (of the paper, simply state 'To...')

Design

Keywords (You will be able to choose keywords when you begin the submission process and you can select up to ten).

Methods

Data Sources (Include search dates) \*for reviews only

Results

Conclusion

### **MAIN TEXT HEADINGS:**

Find your ARTICLE TYPE below and use the relevant headings below in your main text file:

REVIEW article types:

Introduction

The Review

Aim(s)

Methods/Methodology

Design

Search Methods

Inclusion and/or Exclusion Criteria

Search Outcome

Quality Appraisal

Data Abstraction

Synthesis

Results/Findings

Discussion

Conclusion

**Appendix:**

Publication Charges

The Journal does not publish color figures in print. There is no charge for color figures online.

Page charges

There are no page charges. As described above, there are Article Publication Charges when authors choose Open Access.

**Links to useful resources:**

Literature Reviews

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009) Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7)