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GLP-1 receptor agonists in primary care: readiness, equity, and the risk of a two-tiered obesity treatment landscape

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***Abstract*:** Glucagon-like peptide-1 receptor agonists have transformed obesity pharmacotherapy by producing substantial weight loss and, for semaglutide in patients with established cardiovascular disease, reducing major cardiovascular events. Integrating these therapies into primary care is constrained by gaps in provider training, clinical inertia, weight bias, high treatment costs, and fragmented insurance coverage. Racial and ethnic minority groups, low-income communities, and publicly insured patients are less likely to receive or fill prescriptions despite the disproportionate burden of obesity-related diseases. This narrative review examines primary care readiness, structural determinants of access, disparities in prescribing and use, real-world adherence, and policy options for these drugs. Without coordinated action, these therapies may reinforce a two-tiered treatment landscape in which access reflects socioeconomic advantages rather than clinical needs. Equitable implementation will require aligned reforms in coverage and pricing, workforce development, person-centered care, and long-term treatment support.

Keywords: anti-obesity medications, disparities, glucagon-like peptide-1 receptor agonists, health equity, obesity, primary care

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Introduction

Obesity is a major global health challenge that affects more than 1 billion individuals worldwide.[1] A pooled analysis of 3663 population-representative studies from 200 countries and territories estimated that 879 million adults and 159 million children and adolescents aged 5–19 years were living with obesity.[2] In the United States, the estimated age-adjusted adult obesity prevalence was 41.9% from August 2017 to March 2020.[3] Obesity is associated with type 2 diabetes, cardiovascular disease (CVD), several cancers, musculoskeletal disorders, and premature mortality.[4] The estimated aggregate direct medical cost among adults in the United States was $260.6 billion in 2016.[5] The burden also includes impaired quality of life and productivity and falls unequally across populations, making effective and equitable treatment a health system priority.[1]

For decades, pharmacological treatment of obesity has been characterized by modest efficacy and important safety concerns, contributing to the view that obesity should be managed through lifestyle modification alone. Glucagon-like peptide-1 (GLP-1) receptor agonists have changed the treatment landscape. In randomized trials, semaglutide produced a mean 14.9% weight reduction at 68 weeks, and tirzepatide produced a mean 20.9% reduction at 72 weeks at the 15 mg dose.[6,7] In adults with established CVD and overweight or

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obesity but without diabetes, semaglutide reduced the hazard of cardiovascular death, nonfatal myocardial infarction, or nonfatal stroke by 20% relative to placebo.[8] These findings support a therapeutic role that extends beyond weight reduction, although the broader effects of this drug class still require indication-specific evidence.

However, these clinical advances do not ensure routine delivery. Primary care is expected to play a central role in long-term obesity management; however, clinicians report gaps in training and confidence with anti-obesity medications (AOMs).[9,10] Clinical inertia, weight bias, and failure to recognize obesity as a chronic disease further constrain evidence-based treatments.[11] Price comparisons also require a temporal context. A 2023 analysis reported United States monthly list prices of $1349 for Wegovy and $1023 for Mounjaro; however, manufacturer self-pay programs available in June 2026 listed lower cash prices: Wegovy at $199 for the first two starter-dose fills and $349 thereafter, and Zepbound from $299 to $449 depending on dose and program conditions.[12–14] These program prices are not equivalent to insurers' net prices, may change, and do not eliminate coverage barriers. Racial and ethnic minority groups, low-income communities, and publicly insured patients also face documented barriers to prescriptions and refills.[15]

In December 2025, the World Health Organization (WHO) issued conditional recommendations supporting long-term GLP-1 therapy for adults with obesity, excluding pregnant women, as part of comprehensive care for obesity. The conditional rating reflected limited long-term evidence, cost, inadequate health system preparedness, and equity concerns.[16,17] Against this background, this review examines primary care readiness, financial and structural determinants of access, disparities in prescribing and use, adherence, and policies that may prevent a two-tiered obesity care system.

Literature identification and scope

This narrative review used a topic-directed literature identification approach, updated until June 2026, to synthesize evidence relevant to GLP-1 receptor agonist treatment of adult obesity in primary care. Sources were selected for their direct relevance to the review's substantive domains: clinical efficacy and safety, primary care readiness, insurance coverage and cost, racial, ethnic, and socioeconomic disparities, treatment persistence, and policy responses. The evidence base includes randomized trials, meta-analyses, observational studies, surveys, modeling and economic analyses, peer-reviewed reviews and commentaries, and authoritative institutional sources used when current pricing, coverage, or policy information was required. Studies limited to populations with diabetes were included only when they reported mechanisms, safety, treatment delivery, or persistence relevant to obesity care. This was a narrative rather than a systematic review; no prespecified protocol, duplicate screening, or formal study-level risk of bias assessment was used.

The GLP-1 revolution: Clinical efficacy and expanding indications

Clinical evidence supporting the use of GLP-1 receptor agonists for weight management spans multiple agents, formulations, and endpoints. A meta-analysis of 47 randomized controlled trials involving 23,244 participants found mean differences versus placebo of −4.57 kg for body weight (95% confidence interval (CI), −5.35 to −3.78), −2.07 kg/m^2 for body mass index (BMI; 95% CI, −2.53 to −1.62), and −4.55 cm for waist circumference (95% CI, −5.72 to −3.38).[18] Subgroup analyses suggested larger effects among younger participants, women, people without diabetes, those with higher baseline weight or BMI, lower baseline glycated hemoglobin, and those treated for longer durations. These subgroup findings are exploratory and should not be interpreted as individualized causal-treatment effects.

The magnitude of these effects is, therefore, biologically plausible. Native GLP-1 is an incretin hormone released by intestinal L cells in response to nutrient intake. It enhances glucose-dependent insulin secretion, suppresses glucagon levels, delays gastric emptying, and activates central pathways involved in satiety and food reward. Long-acting receptor agonists extend this signaling and support sustained appetite reduction. Tirzepatide also activates the glucose-dependent insulinotropic polypeptide (GIP) receptor; dual GIP and GLP-1 receptor agonism may contribute to its effects on energy intake and metabolism, although the relative contributions of each pathway remain under investigation.[19,20]

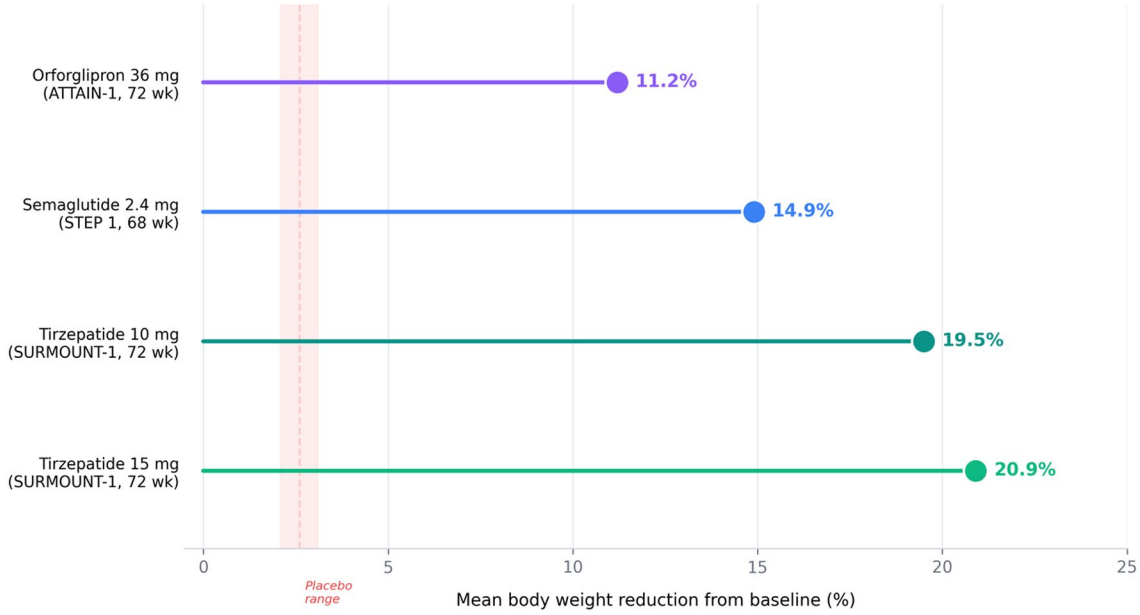


Figure 1. Mean percent body weight reduction from baseline across pivotal GLP-1 and GLP-1/GIP receptor agonist trials in adults with obesity. The values shown are for orforglipron 36 mg at 72 weeks (ATTAIN-1), semaglutide 2.4 mg at 68 weeks (STEP 1), and tirzepatide 10 mg and 15 mg at 72 weeks (SURMOUNT-1); the shaded band represents the placebo response (approximately 2%–3%) across the three trials.[6,7,25] The comparison highlights substantially greater mean weight loss with tirzepatide than with semaglutide or oral forforglipron, while all active treatments exceeded the placebo.
GIP, glucose-dependent insulinotropic polypeptide; GLP-1, glucagon-like peptide-1.

The safety history of earlier anti-obesity drugs provides important information. Rimonabant, a cannabinoid type 1 receptor antagonist, was withdrawn from the European market after evidence of increased psychiatric adverse events, including depressed mood and anxiety.[21] Sibutramine was withdrawn after the Sibutramine Cardiovascular Outcomes Trial showed an increased risk of nonfatal myocardial infarction and nonfatal stroke in high-risk patients.[22] Lorcaserin was voluntarily withdrawn in 2020 after a post-marketing cardiovascular safety trial showed an excess of cancer diagnoses.[23] Unlike these earlier agents, semaglutide has demonstrated cardiovascular benefits in a defined secondary prevention population. Mechanistic differences may contribute to the contrasting safety profiles, but they do not establish why outcomes differ.

Beyond weight loss, observational evidence has identified potential benefits and risks for other outcomes. A United States Department of Veterans Affairs cohort compared 215,970 GLP-1 receptor agonist initiators with several active comparators and 1,203,097 individuals receiving usual care, mapping associations across 175 outcomes. GLP-1 receptor agonist use was associated with lower risks of several substance use, neurocognitive, seizure, and cardiometabolic outcomes but higher risks of several gastrointestinal, hypotensive, renal, and pancreatic outcomes.[24] Because this was an observational analysis, the associations should not be interpreted as proof of causation. Oral formulations are also advancing in ATTAIN-1, orforglipron 36 mg produced a mean 11.2% weight reduction at 72 weeks versus 2.1% with placebo.[25] Together, these findings broaden the research agenda, although indication-specific randomized evidence remains necessary. Figure 1 compares pivotal weight loss trials, and Table 1 summarizes their designs and outcomes.

Primary care readiness: Training gaps and clinical inertia

Barriers to routine GLP-1 receptor agonist delivery can be organized across provider, health system, and patient levels. Provider-level barriers include limited familiarity, prescribing confidence, and weight bias; system-level barriers

Table 1. Key GLP-1 receptor agonist clinical trials for obesity and cardiometabolic outcomes.

Trial	Agent	Population	Mean weight loss	Duration	References
STEP 1	Semaglutide 2.4 mg	Adults with obesity without diabetes	14.9%	68 weeks	(6)
SURMOUNT-1	Tirzepatide 15 mg	Adults with obesity without diabetes	20.9%	72 weeks	(7)
SELECT	Semaglutide 2.4 mg	Overweight or obesity with CVD, without diabetes	~10%	208 weeks (~4 years)	(8, 26)
ATTAIN-1	Orforglipron 36 mg	Adults with obesity without diabetes	11.2%	72 weeks	(25)

CVD, cardiovascular disease; GIP, glucose-dependent insulinotropic polypeptide; GLP-1, glucagon-like peptide-1.

include weak obesity care workflows, prior authorization, coverage exclusions, and inadequate multidisciplinary support; and patient-level barriers include cost exposure, stigma, treatment burden, and difficulty sustaining therapy. These levels interact, so readiness depends on coordinated action rather than isolated clinician education.[27–29]

Provider-level barriers

Despite the robust evidence base, primary care systems appear inadequately prepared to integrate GLP-1 receptor agonists into routine obesity management, as illustrated by a recent UK-focused review of obesity management in primary care.[9] A survey of 1168 primary care providers found that although nearly two-thirds had prescribed AOMs in the preceding 12 months, those who had not prescribed them cited a lack of familiarity with the medications and concerns about drug safety as their primary reasons.[10] Another cross-sectional survey of 785 healthcare professionals reported that while 65% were very or extremely familiar with GLP-1 receptor agonists, only 30% were familiar with GIP receptor agonists and 16% with glucagon receptor agonists, suggesting that knowledge has not kept pace with the evolving pharmacological landscape.[27]

Undertreatment also reflects the role of weight bias and stigma, forces that operate at both the provider and patient levels. Research has consistently documented that healthcare providers hold implicit and explicit negative attitudes toward patients with obesity, which may influence clinical decision-making and reduce the likelihood of initiating evidence-based pharmacotherapy.[10,30] These biases may be compounded by the persistent view that obesity is primarily a consequence of individual behavioral choices rather than a complex, multifactorial chronic disease, a perspective that undermines the rationale for pharmacological intervention.[28]

System-level barriers

Clinical inertia is another substantial obstacle. Even when obesity is diagnosed, evidence suggests that only a minority of eligible patients receive pharmacotherapy for obesity. Data from large health systems in Ohio and Florida revealed that only 8.0% of adults with a BMI $\geqslant$30 who attended weight management programs received an AOM prescription, and only 4.4% filled those prescriptions.[15] This gap between guideline recommendations and clinical practice reflects broader challenges, including provider discomfort with prescribing, weight bias and stigma, and limited insurance coverage.[31]

Patient-level barriers

Patients also report stigma within healthcare and insurance systems, which may deter engagement in obesity care. In a qualitative study of people whose AOM coverage was discontinued, participants described the decision as stigmatizing and unjust and reported hopelessness and fear after losing access.[29] These experiences show how patient-level barriers interact with coverage policy and reinforce the need to treat obesity as a chronic disease, without stigma.[28] The next section directly examines these financial and insurance constraints.

Insurance coverage and cost as structural determinants of access

Cost remains a major barrier, even after recent manufacturer price reductions. Current self-pay offers are generally several hundred dollars per month and depend on the dose, eligibility, refill timing, and program continuation.[13,14] Affordability assessments have also changed with price. A 2022 Institute for Clinical and Economic Review (ICER) analysis issued an affordability alert when semaglutide's estimated annual net price was $13,618.[32] In 2025, the ICER estimated annual net prices of $6829 for injectable semaglutide and $7973 for tirzepatide and judged both to offer high long-term value, while warning that broad uptake could still strain health-system budgets.[33]

A cross-sectional analysis of the National Health and Nutrition Examination Survey data estimated that semaglutide was indicated for 129.2 million U.S. adults for weight management. In that weight management group, the authors reported that 45.7% of eligible adults were privately insured, 18.4% had Medicare, and 10.0% had Medicaid. The same study found that 35.0 million adults were eligible for semaglutide for diabetes management and 8.9 million for secondary CVD prevention, and that across all indications, 26.8 million were insured by Medicare, 13.8 million by Medicaid, and 61.1 million by private insurance.[34] A separate microsimulation modeling study that expanded Medicare coverage of GLP-1 receptor agonists projected that among approximately 30 million Medicare beneficiaries eligible for obesity treatment, roughly 3 million would be treated in the base case and that Medicare drug costs would be $65.9 billion with $18.2 billion in health-care savings, yielding $47.7 billion in net increased spending. The same analysis reported that even under a moderate scenario (5% uptake, 20% adherence, and a 30% price discount), net spending was still projected to reach approximately $8 billion over a decade.[35]

The insurance landscape is fragmented. Medicare Part D has historically excluded drugs used solely for weight loss, although semaglutide can be covered for its cardiovascular indications in eligible patients.[36,37] As of January 2026, 13 state Medicaid fee-for-service programs cover GLP-1 therapies for obesity.[38] In the commercial market, one study found that AOMs were present in only 10%–16% of United States health-plan formularies, compared with 45%–59% for selected therapies for smoking cessation, migraine, daytime sleepiness, and fibromyalgia.[39] Table 2 summarizes these differences.

The detailed payer comparison focuses on the United States because fragmented commercial, Medicare, and Medicaid arrangements make financial stratification particularly visible. Inequitable access is not uniquely American; centralized coverage decisions, manufacturing constraints, and affordability also limit availability internationally, particularly in lower-resource settings.[17,41] These financing structures help determine which groups progress from clinical eligibility to prescription and medication receipt.

Racial, ethnic, and socioeconomic disparities in AOM access

Emerging evidence indicates that access to GLP-1 receptor agonists is not equitably distributed across racial, ethnic, and socioeconomic groups. A retrospective cohort analysis of over 50,000 adults in a large health system found that Black, Hispanic, and other racial and ethnic minority patients had significantly lower odds of receiving AOM prescriptions than White patients, even after adjusting for clinical and demographic characteristics. Patients insured through Medicaid, traditional Medicare, and Medicare Advantage also had lower odds of prescriptions and refills than those with private insurance.[15]

Disparities also occur after prescriptions are made. In a University of Colorado Health cohort linked to the Colorado All Payer Claims Database, non-Hispanic Black and Hispanic patients had fill rates of 55.3% and 58.4%, respectively, compared with 60.9% among non-Hispanic White patients.[42] All participants had continuous insurance coverage, and the observational design did not establish whether affordability, benefit design, structural bias, or other mechanisms caused these differences. In a separate health system cohort, greater area deprivation was associated with lower odds of receiving and filling AOM prescriptions.[15] Together, these findings show disparities at both the prescribing and fulfillment stages without proving a single causal pathway (Table 3 and Figure 2).

Table 2. Insurance coverage barriers to anti-obesity medications across United States payer types.

Payer type	Coverage status for obesity indication	Key barrier	References
Medicare Part D	Historically excluded; recent expansion for cardiovascular indications only	Statutory exclusion of weight loss drugs	(36, 37)
Medicaid	Optional; only 13 state programs cover GLP-1s for obesity as of January 2026	State-level discretion; budget constraints	(38)
Commercial insurance	Variable; only ~10%–16% of United States health insurance plans cover AOMs, and coverage typically requires prior authorization	High drug cost; prior authorization requirements	(39)
Employer-sponsored plans	Increasing but inconsistent; cost remains primary employer concern	Affordability of premiums; limited long-term data on cost savings	(40)

AOM, anti-obesity medications; GLP-1, glucagon-like peptide-1.

Table 3. Documented disparities in anti-obesity medication access across patient characteristics.

Disparity dimension	Key finding	References
Race and ethnicity	Black and Hispanic patients had lower odds of receiving AOM prescriptions than White patients	(15)
Insurance type	Medicaid and Medicare enrollees had significantly lower odds of AOM prescription and fill than privately insured patients	(15)
Area deprivation	Patients in the most deprived neighborhoods (fourth quartile, area deprivation index) had lower odds of new AOM prescriptions	(15)
Prescription fill rate	Non-Hispanic Black (55.3%) and Hispanic (58.4%) patients less likely to fill GLP-1 orders than non-Hispanic White patients (60.9%)	(42)

AOM, anti-obesity medications; GLP-1, glucagon-like peptide-1.

Discussion

The risk of a two-tiered obesity treatment landscape

The convergence of treatment costs, fragmented coverage, and existing health disparities can create parallel systems of obesity care in which access reflects socioeconomic resources and clinical needs. A modeling study estimated that expanded access to weight loss medications could avert more than 42,000 deaths annually in the United States, including more than 11,000 deaths among patients with type 2 diabetes.[43] These are model-based projections that depend on assumptions about eligibility, uptake, adherence, treatment effectiveness, and mortality risk; they are not observed.

Geographic patterns of interest and current affordability reinforce these concerns. A Google Trends analysis found that interest in GLP-1 receptor agonists was concentrated in North America and other high-income settings, which differs from the global distribution of the obesity burden.[44] In the United States, manufacturer self-pay prices of several hundred dollars per month remain unaffordable for many people without coverage.[13,14] Therefore, unequal access may widen existing disparities, although the magnitude of this effect requires direct longitudinal studies. Questions regarding access are also inseparable from appropriate use, product integrity, and long-term safety.

Broader indications, safety, and public health concerns

Beyond established metabolic indications, the musculoskeletal applications of this therapy remain investigational. An editorial described

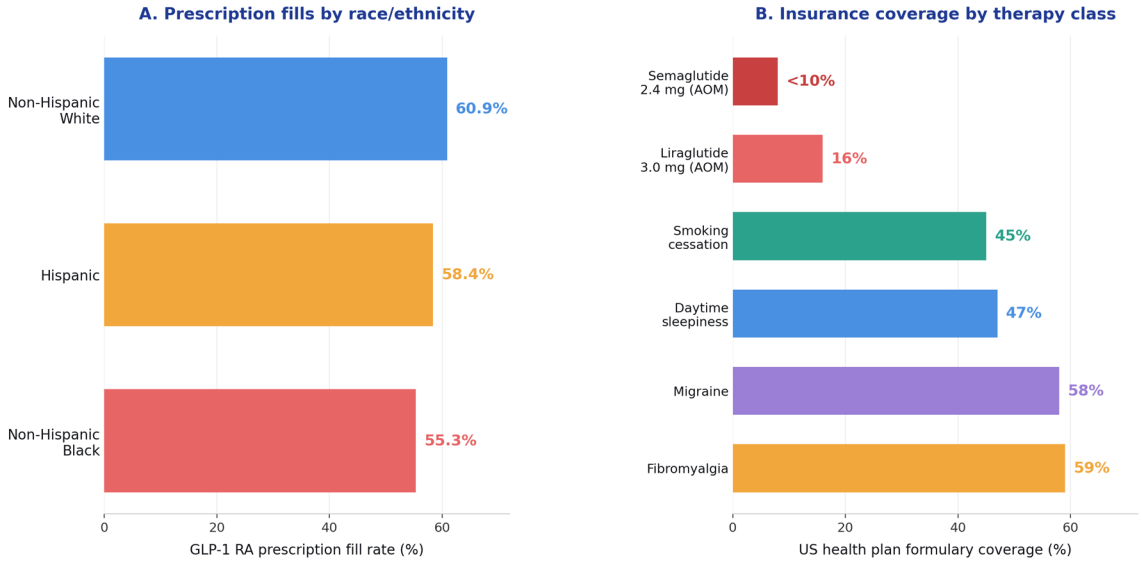


Figure 2. Disparities in GLP-1 receptor agonist access and AOM formulary coverage in the United States. (a) GLP-1 receptor agonist prescription fill rates among adults with a new order, stratified by race and ethnicity in the UCHealth system linked to the Colorado All Payer Claims Database.[42] (b) Percentage of United States commercial, Medicare, and Medicaid health insurance plans providing formulary coverage for two AOMs (liraglutide 3.0 mg and semaglutide 2.4 mg) compared with representative therapies for smoking cessation (varenicline), daytime sleepiness (modafinil), migraine (erenumab), and fibromyalgia (pregabalin).[39] Together, the panels show that racial and ethnic fill gaps occur alongside substantially lower formulary coverage for obesity medications than for comparator drug classes.
AOM, anti-obesity medications; GLP-1, glucagon-like peptide-1.

plausible anti-inflammatory and weight-mediated benefits but also unresolved risks and did not establish GLP-1 receptor agonists as disease-modifying arthritis therapy.[45] A convenience-sample survey of 657 healthcare professionals across 10 countries reported non-diabetic use and self-prescribing, supporting the need for independent clinical assessment and monitoring; however, its self-reported, cross-sectional design limits generalizability.[46] Counterfeit GLP-1 products may contain incorrect doses, harmful ingredients, or no active drugs.[47] Long-term oncological safety also remains uncertain; a meta-analysis of 9 randomized trials involving 9078 participants found that short follow-up and heterogeneity limited firm causal conclusions.[48] Even when use is clinically appropriate, and products are authentic, long-term benefits depend on treatment persistence.

Real-world adherence and the challenge of sustained weight management

Even among patients who gain access to GLP-1 receptor agonists, sustaining treatment and its benefits over the long term presents significant challenges. A real-world analysis of over 4000 commercially insured adults with obesity initiating GLP-1 therapy found that 1-year persistence was only 32.3%, and only 27.2% were considered adherent based on the proportion of days covered.[49] Similarly, a UK primary care study of patients with type 2 diabetes initiating GLP-1 receptor agonist therapy found that 45.2% discontinued treatment within 12 months, with only 33.4% achieving clinically meaningful weight loss of $\geqslant$5%.[50]

Weight gain after treatment cessation complicates long-term management. In the STEP 1 extension, participants regained approximately two-thirds of their prior semaglutide-associated weight loss within 1 year after withdrawal, and several cardiometabolic measures returned to baseline.[51] A joint professional society advisory recommends accompanying GLP-1 therapy with nutrition and lifestyle strategies to address gastrointestinal symptoms, nutrient intake, muscle preservation, and long-term outcomes.[52] These findings support comprehensive multidisciplinary care rather



Figure 3. Proposed integrated model for equitable GLP-1 receptor agonist delivery in primary care obesity management. The model emphasizes that equitable delivery depends on coordinated assessment, shared decision-making, pharmacotherapy, lifestyle support, adherence monitoring, and maintenance.
BMI, body mass index; GLP-1, glucagon-like peptide-1; RDN, registered dietitian nutritionist; SDoH, social determinants of health.

than pharmacotherapy as a standalone intervention (Figure 3).

Evidence-based persistence support should begin before the first dose and continue until maintenance. Primary care teams can use shared decision-making and structured education to set expectations about chronic treatment, likely weight regain after discontinuation, nutrition, hydration, and early adverse effects; arrange regular multidisciplinary follow-ups with dietetic and behavioral support; and use slower titration, temporary dose pauses, dose reduction, or symptom-directed management when gastrointestinal adverse effects threaten discontinuation. Proactive monitoring of protein and micronutrient intake, muscle-preserving physical activity, and treatment affordability can help identify modifiable factors for discontinuing therapy.[52,53]

Policy pathways toward equitable obesity pharmacotherapy

Addressing the structural determinants of access requires coordinated policies. The proposed Treat and Reduce Obesity Act would remove the statutory exclusion of AOMs from Medicare Part D; however, enactment and implementation remain uncertain.[36] In December 2025, the Centers for Medicare & Medicaid Services (CMS) announced the voluntary Better Approaches to Lifestyle and Nutrition for Comprehensive Health Model, which was designed to negotiate lower GLP-1 prices and standardize coverage while integrating lifestyle support. CMS stated that Medicaid participation could begin as early as May 2026 and Medicare Part D participation in January 2027; a separate Medicare payment demonstration was announced for July 2026.[54] These dates describe announced program plans and

should not be read as confirmed enrollment or uptake.

Manufacturer pricing strategies also warrant scrutiny. In its 2025 assessment, the ICER recommended that manufacturers consider substantial price discounts in exchange for higher volumes and that payers avoid coverage policies that worsen disparities.[33] Internationally, the WHO has called for action on manufacturing, affordability, and system readiness and stated that it would work with stakeholders in 2026 on an equitable prioritization framework.[17] These recommendations acknowledge that lower unit prices alone will not resolve workforce, delivery, and continuity of care barriers. At the clinical level, equitable obesity care requires clinician education, decision support, multidisciplinary pathways, and attention to the social determinants of health. Culturally and linguistically responsive care should be integrated with pharmacotherapy, nutrition, physical activity, and long-term follow-up.[9,17,33] These proposals should be interpreted considering the methodological and evidence-based limitations below.

Limitations

This review has some limitations. The topic-directed narrative approach was not exhaustive and did not use a prespecified protocol, duplicate screening, or formal risk of bias assessment; therefore, it may have missed non-English-language and unpublished evidence. The evidence base combines randomized trials, observational studies, surveys, and policy reports with heterogeneous populations, indications, and outcomes, limiting direct comparisons and causal interpretations. Because coverage rules, manufacturer programs, drug prices, indications, and supply conditions change rapidly, policy and cost estimates may become outdated. The detailed payer analysis emphasizes the United States; although an international context was added, the conclusions may not be generalizable to health systems with different financing and primary care structures. Finally, several access and adherence findings were derived from commercially insured or single-system cohorts, which may underrepresent uninsured and lower-resource populations.

Conclusion

GLP-1 receptor agonists have changed obesity treatment by producing substantial weight loss and cardiovascular benefits in selected populations. However, their population impact depends on more than just efficacy. Primary care readiness, clinician training, weight bias, affordability, insurance design, and sustained treatment support shape who receives and benefits from therapy. Current evidence documents disparities in prescribing and prescription fills; however, many studies are observational and cannot establish a single causal mechanism. Equitable implementation therefore requires coordinated pricing and coverage policies, workforce development, person-centered care, and long-term monitoring. The WHO's conditional recommendation provides a useful framework because it links clinical use to health system preparedness, comprehensive care, and fair access. Without these safeguards, effective therapies could reinforce, rather than reduce, existing inequities.

Declarations

Ethics approval and consent to participate

Not applicable. This narrative review did not involve human participants, identifiable patient data, or prospective data collection; therefore, institutional review board approval and participant consent were not required.

Consent for publication

Not applicable. The manuscript contains no identifiable patient data or images.

Author contributions

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Declaration of AI use

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