GLP-1 receptor agonists for obesity: eligibility across 99 countries

Obesity is a complex, multifactorial condition defined by excessive adiposity and associated health risks.[1] The rising prevalence of obesity contributes to the increasing global burden of obesity-related diseases, such as type 2 diabetes and cardiovascular diseases, placing immense strain on health-care systems and economies worldwide. Behavioural interventions, such as diet and exercise, have long been the foundation of obesity management, yet many individuals face challenges in achieving and maintaining substantial long-term weight loss through these approaches alone, especially in current obesogenic environments.[2]

GLP-1 receptor agonists, including combination formulations with glucose-dependent insulinotropic polypeptide, have emerged as an effective therapeutic class for management of obesity and its complications.[3,4] Governments and international agencies, such as WHO, are creating guidelines and exploring policies and programmes to integrate the use of obesity management medicines, such as GLP-1 receptor agonists, into routine care for weight management and cardiometabolic risk reduction in individuals who are at high risk.[5] Understanding the potential demand and socioeconomic implications of GLP-1 receptor agonists is important for the effective design of such policies and programmes. Thus, we aimed to estimate and characterise the adult population eligible for GLP-1 receptor agonists for weight management using nationally representative health surveys and key inclusion criteria from trials to guide such policies.

We analysed pooled, individual participant data from nationally representative, cross-sectional household health surveys conducted in 99 countries between 2008 and 2021 (appendix pp 2–67). Our sample comprised non-pregnant individuals aged 25–64 years with an available diabetes biomarker, blood pressure measurement, and BMI measurement, as well as complete data on hypertension and diabetes diagnoses (appendix pp 69–75). Eligibility for GLP-1 receptor agonists was determined by applying the inclusion criteria from key randomised clinical trials.[3,4] Individuals were defined as eligible for GLP-1 receptor agonists for weight management if they had a BMI of 30 kg/m² or more or a BMI of 27 kg/m² or more with hypertension or diabetes, or both—two common weight-related comorbidities. Hypertension was defined based on measured blood pressure and diabetes was defined based on glycaemic markers (HbA_{1c} and

This online publication has been corrected. The corrected version first appeared at thelancet.com/diabetes-endocrinology on January 12, 2026

See **Online** for appendix

	Countries (n)	Eligible individuals (n/N)	Weighted eligibility (95% CI)
Eligibility by country-level characteristics			
Global	99	198266/810635	27·0% (26·2–27·8)
Country-income group			
Low-income country	15	7025/54457	11·7% (10·9–12·5)
Lower-middle-income country	34	130213/602768	25·2% (23·6–26·8)
Upper-middle-income country	30	36536/90113	26·2% (25·0–27·4)
High-income country	20	24492/63297	41·8% (40·5–43·2)
World region			
Europe and North America	11	17248/43327	42·8% (41·4–44·2)
Central Asia	7	7961/20840	34·7% (32·8–36·7)
Middle East and north Africa	10	16620/39621	37·2% (36·0–38·5)
Latin America and the Caribbean	17	17713/43262	38·8% (37·8–39·9)
Pacific island nations	13	9446/18043	41·0% (39·0–43·1)
South, east, and southeast Asia	17	116705/573375	23·1% (21·9–24·4)
Sub-Saharan Africa	24	12573/72167	16·4% (14·7–18·4)
Eligibility by individual-level characteristics			
Sex	99		
Male		49454/192720	25·5% (24·6–26·4)
Female		148812/617915	28·5% (27·6–29·5)
Age (years)	99		
25–34		45098/295261	17·9% (17·0–18·8)
35–44		69264/275781	27·1% (26·1–28·1)
45–54		55688/174104	32·2% (31·1–33·3)
55–64		28216/65489	38·3% (36·8–39·7)
Education	98		
No education		31264/188283	22·8% (20·5–25·4)
Any primary education		42859/170298	25·6% (24·6–26·7)
Any secondary education or higher		122961/449262	28·2% (27·4–29·1)
Income quintile	77		
Lowest		20018/144227	19·3% (18·1–20·5)
Low		27777/151531	21·1% (20·1–22·2)
Middle		34265/148818	24·2% (23·1–25·3)
High		39045/141345	25·4% (24·2–26·6)
Highest		42507/128830	27·5% (26·3–28·8)

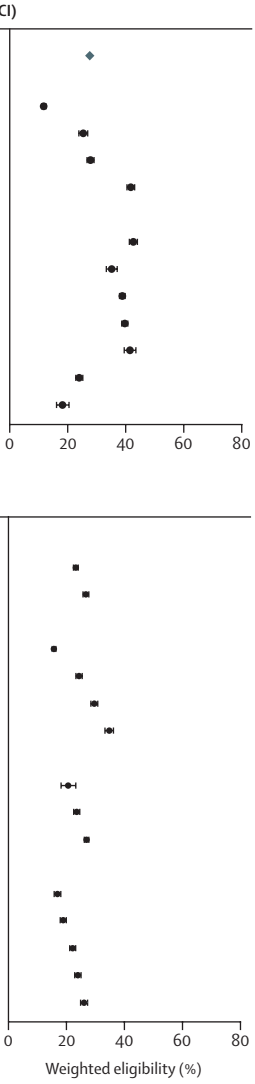

***Figure*: GLP-1 receptor agonist eligibility by country-level and individual-level characteristics**
All analyses included sampling weights that we rescaled by the size of each country's 2020 population aged 25–64 years, using the 2024 UN Population Prospects. Country-income group refers to the World Bank per capita country-income categories in the year each survey was conducted. World regions are adapted from the Non-communicable diseases Risk Factor Collaboration classification. Education data was unavailable in the survey from Tokelau. Income data was unavailable in the surveys from Bangladesh, Barbados, Belarus, Burkina Faso, Costa Rica, Czech Republic, El Salvador, England, Iraq, Libya, Malawi, Malta, Nepal, Nigeria, Pakistan, Qatar, Spain, Tokelau, Turkmenistan, the USA, Venezuela, and Wallis and Futuna.

plasma glucose). We did not consider other obesity-related comorbidities, such as obstructive sleep apnoea or cardiovascular disease, because data were not consistently available across surveys. For countries in the south, east, and southeast Asian region, we adjusted the eligibility to a BMI of 28 kg/m² or more or a BMI of 24 kg/m² or more with hypertension or diabetes, or both, in line with regionally based clinical trials.[6] All statistical analyses included sampling weights that we rescaled in proportion to the countries' population sizes. This study was deemed exempt from regulation by the institutional review board at the University of Michigan (Ann Arbor, MI, USA; HUM00201307).

The overall pooled sample included data from 810 635 individuals from 99 countries. According to World Bank country-income group, 15 surveys were conducted in low-income countries, 34 in lower-middle-income countries, 30 in upper-middle-income countries, and 20 in high-income countries. All but 27 surveys were WHO STEPS surveys. The median response rate was 87%. The mean age of respondents was 38 years (SD 9·7), and 617 915 (48·9%) of respondents were women (appendix pp 76–78).

An estimated 27·0% (95% CI 26·2–27·8) of the total pooled sample were eligible to receive a GLP-1 receptor agonist. Incorporating age-stratified UN 2020 population size estimates, this corresponds to approximately 799·0 million individuals (appendix p 100). By country-income group, eligibility was 11·7% (95% CI 10·9–12·5) in low-income countries, 25·2% (23·6–26·8) in lower-middle-income countries, 26·2% (25·0–27·4) in upper-middle-income countries, and 41·8% (40·5–43·2) in high-income countries (figure). 34·6% (33·7–35·6) were eligible due to the presence of hypertension or diabetes, or both, for individuals with a BMI of 27 kg/m² or more (or BMI ≥24 kg/m² in Asia; appendix pp 101–103, 107). Eligibility for GLP-1 receptor agonists for weight management varied substantially across world regions. The highest eligibility was observed in Europe and North America (42·8%, 95% CI 41·4–44·2) and the Pacific Islands (41·0%, 39·0–43·1; figure). In south, east, and southeast Asia, although 23·1% were eligible for GLP-1 receptor agonists, this region accounted for the largest absolute number of eligible individuals (appendix p 100).

Women were more likely to be eligible (28·5%, 95% CI 27·6–29·5) than men (25·5%, 95% CI 24·6–26·4). Eligibility increased with age, ranging from 17·9% (17·0–18·8) among individuals aged 25–34 years to 38·3% (36·8–39·7) among individuals aged 54–64 years (figure). In the overall sample, GLP-1 receptor agonist eligibility was higher among households with higher income. When stratified by country-income group, eligibility increased with household income in low-income and lower-middle-income countries. In contrast, in high-income countries, eligibility was highest among households in the lowest income quintiles (appendix p 106).

A previous study reported that 129·2 million individuals in the USA are eligible for semaglutide for weight management.[7] Building on this finding, to our knowledge, we provide the most extensive global estimates of GLP-1 receptor agonist eligibility for obesity to date, showing that a substantial population across all economic strata worldwide would also qualify for GLP-1 receptor agonists. Currently, only a few high-income countries are likely to afford coverage for GLP-1 receptor agonists for obesity management, and the allocation criteria differ considerably between countries.[8] Data on the availability and use of GLP-1 receptor agonists for weight management in low-income and middle-income countries remain scarce.

Given the high levels of eligibility and the substantial costs associated with GLP-1 receptor agonists, their widespread implementation is unlikely to be feasible in many health systems at this time. Currently, the short-term and long-term budget effects of implementing GLP-1 receptor agonists for obesity treatment are unknown. Thus, the key implementation challenge to use these medications lies in the ability of individual health systems to integrate considerations of cost, need, potential benefit, and the underlying infrastructure to support rational, high-quality, and sustainable obesity care.[8] Optimal implementation will require evidence-based, context-specific approaches. Our study provides the initial foundation to inform such policy decisions. Although our estimates show overall eligibility at the national level, countries might also want to identify patient subpopulations that could benefit most from GLP-1 receptor agonists, such as those with higher BMIs or multiple comorbidities. Moreover, the distribution of eligibility might have broader implications for how systems of obesity care should be designed and implemented. For instance, evidence suggests that patients with lower incomes, less health literacy, or access to fewer health resources who receive GLP-1 receptor agonists might require additional support for adherence.[9]

Lastly, as these medications are introduced at a larger scale, health systems must be prepared to monitor and mitigate potential harms, including adverse effects and off-label use, and to support long-term adherence when needed. GLP-1 receptor agonists may not be preferred for many people, including those who could potentially benefit from them. Addressing the global rise in obesity requires a more comprehensive, multifaceted approach that integrates medical treatments with sustainable strategies, such as multilevel agricultural and food policies related to production, procurement, pricing, marketing, and sales, as well as obesity prevention policies.

This study has several limitations. First, we did not account for all weight-related comorbidities for which GLP-1 receptor agonists could be indicated; however, diabetes and hypertension are common and likely encompass the

greatest proportions of those eligible.[7] Second, we did not exclude individuals on dialysis, those with previous bariatric surgery, or those with contraindications to GLP-1 receptor agonists, such as medullary thyroid carcinoma and multiple endocrine neoplasia syndrome type 2, which are rare. This overestimation of eligibility is likely offset by the underestimation resulting from the restricted number of obesity-related comorbidities considered. Third, the BMI adjustment for Asian populations involved assumptions regarding lower BMI thresholds, which might not fully reflect the diversity of health risks within Asia as well as various pre-existing BMI thresholds in select countries. Fourth, the surveys were conducted in different years, which might introduce temporal variability in obesity prevalence; however, as obesity prevalence has been steadily increasing over time, our estimates are unlikely to overestimate current eligibility.[1] Fifth, our results are not representative of all countries worldwide, although our dataset of surveys from 99 countries is, to our knowledge, the most comprehensive available empirical evidence for global comparison. Sixth, data were not harmonised across differing diagnostic criteria. Seventh, the population estimates did not account for pregnant women. Finally, our data did not permit us to distinguish between type 1 and type 2 diabetes, although over 95% of patients with diabetes globally have type 2 diabetes.[10]

In conclusion, more than one in four adults in the study population qualify for GLP-1 receptor agonists for weight management, with almost four-fifths of those eligible residing in low-income and middle-income countries. The scale of potential eligibility for GLP-1 receptor agonists, combined with their high costs, demands strategic, tailored policies and programmes to integrate GLP-1 receptor agonists in routine care that are based on clinical priority, cost-effectiveness, and health-care delivery capacity.

RA has grants and contracts with Novo Nordisk, Novartis Foundation, Virchow Foundation, and the Gates Foundation unrelated to the study. RA received Honoria for lectures and presentations for Merck, unrelated to the study. MDH has received travel support from the World Heart Federation and consulting fees from PwC Switzerland. MDH has pending patents for heart failure polypills. MDH has an appointment at The George Institute for Global Health, which has a patent, license, and has received investment funding with intent to commercialise fixed-dose combination therapy through its social enterprise business, George Medicines. CA has received honoraria and sat on the advisory boards and steering committees for AstraZeneca and Novo Nordisk. SGKY was supported by the National Institutes of Health, grant number T32 HL007081. DF was supported by the US National Heart, Lung, and Blood Institute (award K23HL161271), the Michigan Center for Diabetes Translational Research (award P30DK092926), the University of Michigan Claude D Pepper Older Americans Independence Center (award 5P30AG024824), and the University of Michigan Caswell Diabetes Institute Clinical Translational Research Scholars Program. JMG was supported by the US National Heart, Lung, and Blood Institute (award 1R01HL172907–01A1). All other authors declare no competing interests.

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Published **Online** December 3, 2025 https://doi.org/10.1016/S2213-8587(25)00392-4

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Social learning theories and metabolic health: the centenary of Bandura's birth

100 years ago, on Dec 4, 1925, Albert Bandura was born in a small rural Canadian town with limited educational resources. Encouraged by parents who valued education, he developed a remarkable motivation for self-learning and would go on to become one of the most influential social–cognitive psychologists of all time.[1]

Bandura's work, particularly his focus on observational learning and the concept of self-efficacy, offers a valuable perspective on the epidemic rise of metabolic disease.

His most famous study, the Bobo doll experiment in 1961, demonstrated that early relationships are based on identification: children learn and acquire new behaviours primarily through observation and mimicry. In this experiment, a group of children observed an adult behave aggressively toward an inflatable doll, whereas another group watched an adult play quietly with other toys in the room. Children who witnessed the aggressive behaviour were more likely to reproduce it.[1]

This principle of observational learning and modelling is highly relevant to understanding contemporary health behaviours.

The obesogenic environment we live in has been a major driver of rising rates of obesity and type 2 diabetes. Although public health initiatives attempt to change this environment, our eating habits and lifestyle choices are established and reinforced within our social context. Adults, and especially children, observe and imitate health-related behaviours, such as dietary habits and physical activity, modelled by family, peers, and influential figures in the media and politics. Bandura's theory of social learning helps explain how behaviours that undermine metabolic health are established, normalised, and transmitted across generations.

Bandura's theories extend beyond imitation: a key predictor of behaviour change is the concept of self-efficacy[1,2] (ie, the individual's belief in their ability to perform actions needed to achieve a goal). Today's food environment undermines self-efficacy through aggressive lobbying and advertising for cheap ultra-processed food, and economic and social pressures that limit access to healthier options. As underscored in a recent *Lancet* Series, the unchecked proliferation of ultra-processed food[3–5] is largely driven by corporate interests—the relentless pursuit of profit maximisation, at the expense of public health and societal wellbeing. Although many people understand the importance of healthy diets and behaviours, most lack confidence (ie, exhibit low self-efficacy) that