



Corbion

Shifting Food Preferences Among GLP-1 Users

Opportunities for the Food Industry to Meet Consumer Needs



The food industry is currently amid a significant shift in the eating habits of people using anti-obesity medications such as Ozempic, Wegovy, Mounjaro and Zepbound, and similar glucagon-like peptide 1 (GLP-1) drugs. This phenomenon, nicknamed the Ozempic effect, has the potential to reshape the eating habits of millions. It's not just an opportunity but a necessity for food companies to adapt to these changes quickly and effectively. The sooner they do, the sooner food makers and suppliers can cater to these consumers' evolving preferences and needs and capitalize on this growing market.

Recent proprietary Corbion surveys of adult GLP-1 medication users for weight loss provide invaluable insights into their shopping habits, eating behaviors and needs.¹ Based on these surveys, this editorial addresses these customers' preferences for protein, dairy and bakery items and their changing nutritional needs. Understanding these preferences is critical to adapting to the changing food landscape and catering to the needs of this growing consumer base.

GLP-1 Medication Use and Growth Potential

While these drugs have a twenty-year history of treating Type-2 diabetes (T2-D), recent data shows additional benefits for addressing obesity and cardiovascular disease

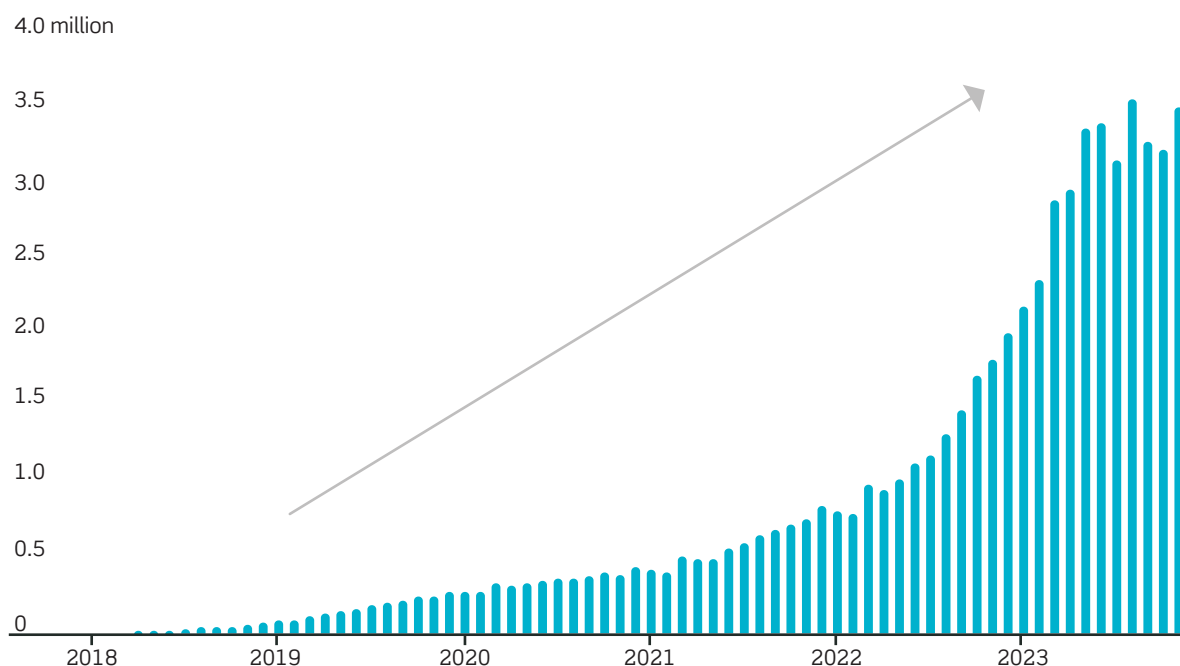
risk. This new GLP-1 era has caught the attention of a broader demographic of consumers, including those interested in quick weight loss and higher fitness levels.

Monthly prescriptions for GLP-1 medications for Ozempic, Wegovy, Mounjaro and Zepbound rose steadily and dramatically from .5 million in 2021 to more than 3.5 million in 2023 (see FIGURE 1).² About 13% of T2-D patients take the medications, which is expected to rise to 30% by 2030. The number of people taking GLP-1 drugs who are non-diabetic but are overweight or obese rose by 700% from 2013 to 2019. Forecasters estimate that more than 15 million people with obesity will be taking a GLP-1 medication by the new decade, with overall use reaching 30 million.²

The surge in the popularity of GLP-1 medications took pharmaceutical companies by surprise, leading to reported shortages of the injection pens used to administer the drugs.³ Due to limited access, people who depend on these medications for TD-2 and heart disease are at risk of complications. In the short term, the FDA has allowed physicians to obtain the drugs from compounding pharmacies, and patients can use traditional needle and vial injections until the backlog is resolved.⁴

Monthly Prescriptions of GLP-1 Drugs

[Figure 1] It is estimated that 15 million people with obesity will be taking a GLP-1 medication by 2030, with overall use reaching 30 million for weight loss and chronic health conditions.



Note: includes Ozempic, Wegovy, Mounjaro and Zepbound

Source: IQVIA Institute for Human Data Science

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How do GLP-1 agonists work?

To best understand why this phenomenon is significant to the food industry and how it affects the development of new products, one must understand the purpose of the hormone GLP-1. In healthy individuals, when food is eaten, a 30-amino acid peptide hormone called glucagon-like peptide 1 (GLP-1) is released within 20 to 30 minutes.⁵ This hormone stimulates insulin production and suppresses glucagon secretion in response to the absorption of nutrients. Glucagon prevents glucose levels from dropping too low. The process keeps blood sugar balanced and delays gastric emptying, which signals the brain to create the feeling of fullness.

Similarly, GLP-1 agonists prescribed for obesity and diabetes, the most common of which is semaglutide, mimic this process with one significant change—the effects last as much as 48 hours longer than the normal biological process.⁶ So, people feel satiated longer, hence their desire to eat less and focus on lower-calorie foods.

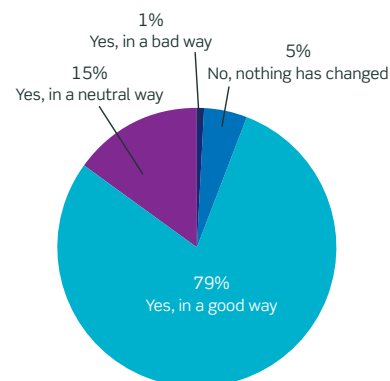
As of now, what is known is that when people stop taking these peptides, the benefits of satiation and healthy food choices do not last. Though the medical community is still working to fully understand the long-term effects of this growing class of drugs, they say patients have achieved significant weight loss goals. Users of GLP-1 medications report they are “happy, healthier and more conscientious consumers.”¹

GLP-1 food preferences: more protein, less sugar and fats

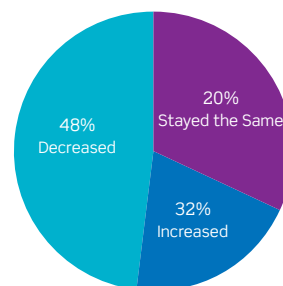
Among the participants in the Corbion survey who use GLP-1 for weight loss, 48% reported a decrease in overall food consumption due to reduced appetites. Estimates suggest that the reduction in caloric intake ranges from 20% to 25%. What's particularly notable are food preferences caused by this biological process — not only does it lead to weight loss — but it also steers individuals towards preferring protein and savory-umami flavors while decreasing their consumption of high-fat and sugary foods. GLP-1 users are inclined towards foods with protein and fiber that emphasize “real” ingredients and natural flavors and are preservative-free.

[Figure 2] A majority of GLP-1 users for weight loss surveyed by Corbion say that they “feel like a different person.” Nearly half have decreased their food consumption.

Q: Do you feel like a different person since you have been on GLP-1 medication?



Q: Overall, how has your consumption of food changed since taking a GLP-1 medication?



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[Figure 3] These consumers are more satisfied with balanced meals, snacking less on sweet and salty snacks and starchy and high-fat foods.



Spending Less & Eating Less

Majority believe GLP-1 changed them for the better, citing a decrease in overall food consumption since taking it.

Spending less on groceries now than ever before

- Buying less/eliminating ice cream, salty snacks, & soda from their diets
- Smaller pack sizes for meat
- Looking for more protein, less sugar & fats in products
- They are eating out less at restaurants than ever before



More Conscious of Nutrition Labels & are Healthier

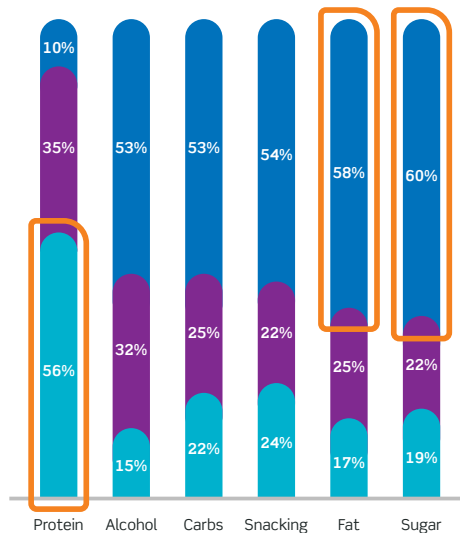
Claims motivate purchases

- ‘The ‘use of “real” ingredients’, ‘high source of protein’, ‘high source of fiber’, ‘preservative-free’ and ‘natural flavor’ claims are most influential
- Weight Watchers, Atkins and Keto are the most influential diets
- Craving more Umami flavors, less sweet
- More active - physically & sexually; report better physical, mental and emotional health

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Emphasis on Smaller Portions and Packaging

As GLP-1 shoppers' dietary preferences change and snacking declines, they shop less often and buy less food. On average, GLP-1 shoppers buy 1% to 2% fewer groceries and have dropped consumption of confectionery, baked goods and salty snacks by as much as 3%, according to Morgan Stanley 2023 data. When they shop, they want smaller portions and packaging to help them eat only what they can consume and not let anything go to waste.



[Figure 4] As taste preferences shift from sweet to savory, **protein-rich products are the food of choice.**

Respondents' answers to consumption habit changes since starting on GLP-1 medication.

■ Less Now
■ About the Same
■ More Now

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Categories that GLP-1 Users Purchase Less

[Figure 5]

% of consumers surveyed are the same items, but buying smaller pack sizes and shopping less often for them

"I am staying with the products I usually buy, but buying smaller pack sizes"

"I am staying with the products I usually buy, but shopping less often for them"

Fresh Meat

(raw meat such as beef, chicken, pork, etc.)

86%

46%

40%

Dairy Products

(ice cream, milk, yogurt, etc.)

87%

47%

40%

Salty Snacks

83%

39%

44%

Processed Meats

(frankfurters, dinner sausage, lunchmeat, etc.)

78%

41%

37%

Bakery, Cereals, Morning Goods

77%

43%

34%

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Who are GLP-1 users and potential users?

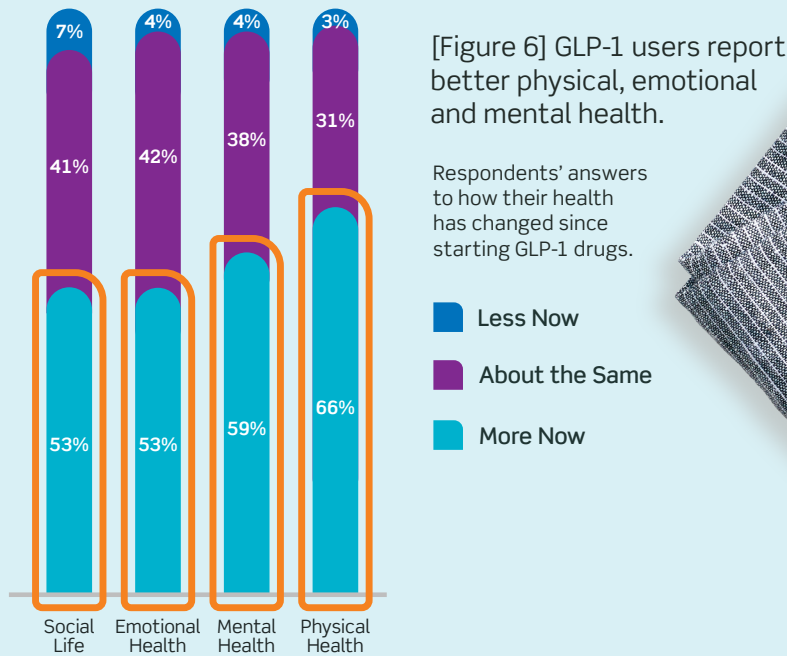
A KFF Health May 2024 tracking poll (formerly Kaiser Family Foundation) points to dramatic rises in awareness of GLP-1 drugs. About 32% of adults report they have heard “a lot” about these drugs, up from 19% in July 2023.⁷ A principal driver of increased awareness can be attributed to off-label use beyond diabetes, including weight loss, obesity, heart disease and stroke prevention.

According to a 2024 study in the *Annals of Internal Medicine*, 1 million new GLP-1 medication users (from 2011 to 2023) point to a twofold increase for those who do not have type 2 diabetes.⁸ Researchers noted that the proportion of off-label users of GLP-1 medications without FDA-approved indications rose from 0.21% in 2019 to 0.37% in 2023, and it is expected to increase considerably in the next decade.

More than half of GLP-1 users surveyed by Corbion take the medication on the advice of their physicians. A common theme among adults under 65 taking these medications is they are stressed and busy professionals

and parents. While they understand the importance of maintaining a healthy diet, keeping their weight down and staying within normal blood sugar levels, getting there is difficult. Pressures of work and time constraints of daily life lead them astray, causing weight gain and metabolic disorders like obesity and heart disease. Fitness-minded individuals are looking for the extra edge to improve their performance. While some older users are addressing complex chronic illnesses, others are trying to stay as healthy and youthful as possible as they age.

These medications right the course by quickly improving health outcomes, reducing unhealthy food cravings and portions, giving them a refreshed outlook on health and active lifestyles and improving emotional health and social life.



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Corbion GLP-1 Survey Personas

Within the group of GLP-1 consumers, various subsets have unique habits and needs that will influence the foods they purchase and why. Food manufacturers must understand these nuances when formulating for the GLP-1 consumer group. Beyond these consumer personas, the cost of GLP-1 drugs defines this consumer base and price remains a concern among all users of GLP-1 medications.

Before pharmaceutical company discounts or insurance, a monthly dose costs between \$950 and \$1350.⁷ Insurance covers partial costs for adults under 65; however, the out-of-pocket difference is difficult to afford. According to KFF polling, 54% of all adults who have taken GLP-1 drugs said it was “difficult” to afford the cost, and 22% said it was “very difficult.”⁷

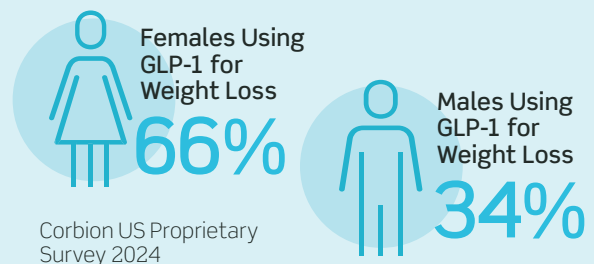
Another caveat is that once the weight loss is achieved, insurance plans will no longer cover the costs for some users.⁷ For now, most GLP-1 customers are in higher income levels, \$75,000 and above, because of the high costs of the medications.

For older Americans, Medicare is currently prohibited by law from paying for weight loss prescription drugs. The KFF

[Figure 7] Younger-Middle Aged with ‘Means’

GLP-1 users skew:

- Ages 35-54 yrs. Millennials and Gen X
- Highly educated (some college or more)
- Live in urban areas
- Higher income (\$75K + a year) — with a spike in the \$100K-\$150K range
- High managerial, administrative or professional



polling shows that 8% of adults 65 and older have taken a GLP-1 medication for a chronic condition, and 1% say they have taken a GLP-1 drug to lose weight. Yet, nearly four in ten (37%) adults ages 65 and older report being told by a doctor they are overweight or obese in the past five years.

GLP-1 User Personas in the Corbion Data Sector

	Persona & Lifestage	Lifestyle	Why Take GLP-1?	Food Influences
	Social Butterflies 22-35 Gen Z & Millennial Early Career Professionals	Demanding careers that leave little time for meal preparation and exercise. Socially active, eat out often, but remain conscientious about their health and appearance.	Weight loss is tied to confidence and social acceptance. GLP-1 use boosts self-esteem and appearance. Trend-driven, willing to try new diets, convenient health fads.	Trendy snacks, menu hacking on comfort foods, take-out, flexitarians, TikTok eating adventures. Loves grocery shopping for organic/sustainable foods but limited by budget and confidence.
	Fitness Enthusiast 30 - 45 Millennial & Gen X Varying Careers	Health-minded, committed exercisers, members of fitness communities, gyms, or clubs. Aware of the latest supplements, nutrition app data wearables and fitness gear. Share healthy meals and achievements on social media.	Seeks to lose 5-10 pounds to enhance physical appearance and performance. GLP-1 medication manages appetites and unhealthy cravings. Likely to use GLP-1 temporarily and go back to using the drug when weight returns.	Profound understanding of the importance of staying physically active, strong and flexible to support health. Watch calories, hydrate consistently and consume protein-rich diets and supplement with functional foods to support performance and recovery.
	Health-Conscious Careerist 35-55 Millennial & Gen X Managerial or professional roles	Affluent, middle-to-upper managers who work long hours in high-stress environments and travel often. Maintain gym memberships but have little time for exercise and struggle with weight gain.	Want sustainable, weight loss solutions for themselves and set an example for their kids. Using GLP-1 drugs to lose 10-15 pounds, alongside a doctor-recommended diet and exercise plan.	Regular consumers of better-for-you convenience foods, but struggle with portion control. Read food labels and care about organic, plant-based, functional and nutrient-dense foods. Open to trying new, healthy food trends.
	The Busy Parent 30-50 Millennial & Gen X Working parent - managerial or professional role	Juggling work-life and parenting. Committed to high-powered, high-paying jobs. Stress and time constraints prevent healthy meal planning, and meeting health and fitness goals.	Seek weight loss to increase energy levels, manage stress and lower chronic disease risk. Would like to be more active and involved with their kids' activities.	Want convenience (sheet pan, crock pot, easy prep) but not if it comes at expense of wholesomeness and health. Place long-term family health first and want updated classic family fare with plant-based, gluten-free, or dairy-free options.
	Retirees/Twilight Professionals 50-70 Gen X & Boomer Near retirement or retired professionals	As work schedules shift, these individuals want to maintain health and mobility and an active social life with friends and family.	Want to lose 15-20 pounds, manage metabolic health issues or prevent serious illness. Most have struggled with above-average weight for their adult lives, which is exacerbated by lifestyle metabolic changes.	Though some face age-related health issues most don't feel, act, look, or eat like "old folks." Take a bull-by-the-horns attitude toward health conditions through diet, exercise and general wellness. Many adhere to specialized or doctor/nutritionist-recommended diets and do more home cooking than average consumers.

Food Industry Opportunities to Meet GLP-1 Consumer's Preferences and Needs

Food companies have an opportunity to meet the needs of this growing consumer demographic by offering fresh, frozen and shelf-stable products in small portions with fewer calories that provide protein, minimally processed ingredients, fruits and vegetables, functional fibers, hydration and digestive support. Corbion's research found that consumers reported buying smaller pack sizes in all the major categories, including bakery products, fresh and processed meats and dairy products.

Roger Clemens, DrPH, former IFT president and professor at the University of Southern California School of Pharmacy, agrees. 'Meeting these consumers' dietary needs require a deep understanding of personalized medicine and how pharmaceuticals affect nutritional needs,' he says.

“ Meeting these consumers' dietary needs requires a deep understanding of personalized medicine and how pharmaceuticals affect nutritional needs. ”

These medications invite a new era of food and beverage product innovation. “There is an opportunity for food makers to incorporate the physiological impact of their products along with the psychographic needs of consumers,” says Kantha Shelke, PhD, principal at Corvus Blue LLC and professor of food and dietary supplement safety regulations at Johns Hopkins University. “Consumers taking these medications want a healthful food makeover without the discomfort of fasting, deprivation and the fear of detrimental effects on health.”



Need for Collaboration with the Health Community and Food Industry

While most scientific attention has been on weight loss for GLP-1 drugs, which averages about 15% over 12-to-18 months, emerging research shows that the effects are more than calorie reduction.⁹ “GLP-1 drugs influence neural-hormonal changes that lead to shifts in their eating behaviors,” says Disha Narang, MD, a Chicago-based endocrinologist.

Studies using functional magnetic resonance imaging (fMRI) show decreased neuronal responses in the brain regions connected to appetite and reward. Semaglutide, the active ingredient, binds to GLP-1 receptors in the subcortical areas of the brain, which affects taste preferences and food intake behaviors by interacting with neurons in the hypothalamus. “It’s critical to understand that the regulation of GLP-1 is neurohormonal, which means the process involves hormones released by the nervous system and mechanisms that involve both neural and hormone mechanisms and pathways,” says Dr Narang.

A common observation is a reduction in “food noise,” described as *the experience of a constant stream of food-related thoughts and internal mental chatter about what to eat, how much and questions about when to eat next and what that meal will be*. Along with reducing food chatter, consumers say they are more

interested in exercising, socializing and sexual activity.

“Each of my patients responds differently to the medications,” says Dr. Narang, MD, a Chicago-based endocrinologist, “Weight loss varies by individual and attention to exercise, stress management and eating healthy. The medications are beneficial because patients feel fuller, so they eat less and focus on healthier foods,” she says, “but there is much more to it.”

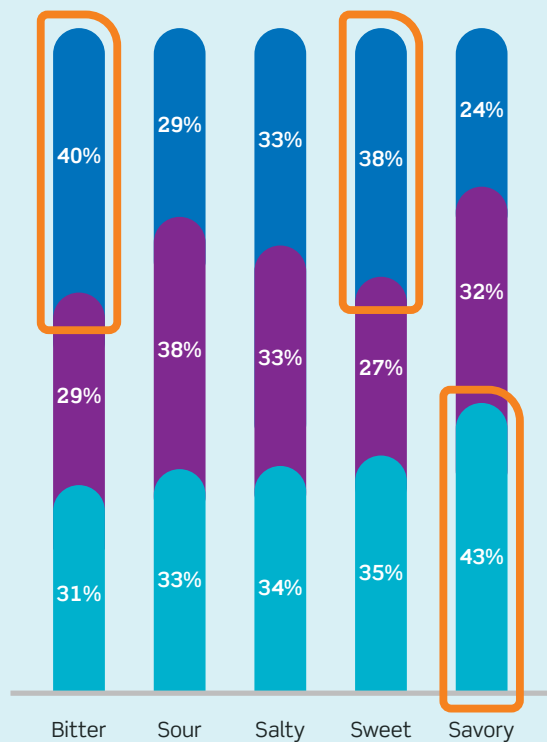
As many as 61% of those surveyed in the Corbion study said they get nutrition advice from medical professionals. Dr. Narang wants to see the food industry work with physicians to develop foods supporting these consumer health goals. “The food environment my patients navigate is very challenging, which is often why they need these medications,” she says. “Many lack the skills to know what to purchase and how to cook for themselves and their families.” Dr. Narang cites a list of barriers, such as large portions, unfamiliar ingredients and inability to find foods and beverages they need and feel comfortable eating from grocery stores and restaurants. This consumer base calls for nutrient-dense smaller portions with carefully considered macro- and micro-nutrients. Clemens, a pharmacist and university researcher, suggests that before manufacturers jump into what they think is best, consider bringing in close specialists in pharmacology, nutrition, food science and physicians trained in culinary and integrative medicine to collaborate.

What Influences GLP-1 Consumers Protein Consumption?

- 37%** from a medical professional
- 32%** from personal health concerns
- 18%** from changes in taste preferences
- 8%** no change observed
- 5%** other dietary restrictions or considerations

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[Figure 8] An overriding observation by GLP-1 users is the enhanced desire for savory umami flavors. Corbion's research found that 43% of GLP-1 users are experiencing increased cravings for savory foods and decreased cravings for sweet, salty and even bitter foods.

Respondents' answers on if they noticed a difference in cravings for the following tastes, after taking GLP-1.

- Less Now
- About the Same
- More Now

Protein Packs a Preferential Punch for GLP-1 Users

After years of struggling, GLP-1 users are surprised by how cravings for salty and sweet foods disappear. They are replaced by a strong desire to eat healthier foods, particularly savory umami proteins, because of how the peptides affect appetite and cravings.

Whether with drugs or through normal physiological responses, GLP-1 peptides play a role in the gut-brain axis, sending messages from the gut to the brain telling the individual they are full or satiated. GLP-1 users frequently comment about reduced food noise or mental messages prompting them to eat more or consume unhealthy foods. When this process functions as it should, individuals crave savory foods over sweet and bitter.

Portion size is a factor that crosses all sectors, even protein. Snacks take on new meanings as mini-meals because consumers are less interested in non-nutritious foods to fill their tummies between meals. They are more interested in finding a balanced snack-sized mini-meal with an appealing 3-ounce protein portion, a raw or cooked vegetable and a healthy fibrous carbohydrate.

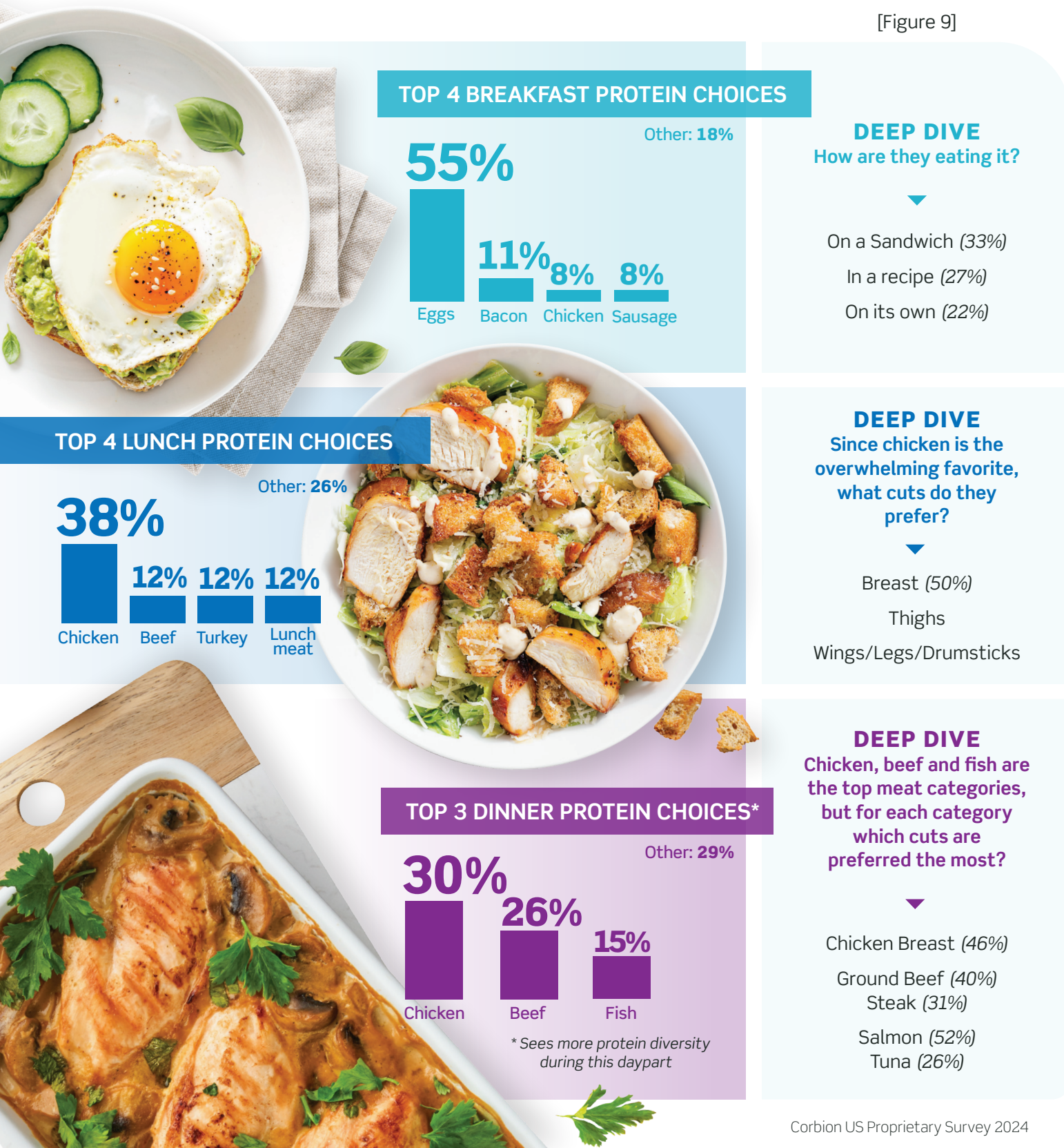
Among those in the Corbion survey, 77% noticed specific protein preference changes for all meals, with chicken, eggs, ground beef and steaks rising to the top of the list.



Protein Preferences for GLP-1 Users

For GLP-1 users, it's imperative they are eating protein at every meal and balancing their intake throughout their day. We asked our survey respondents what they're eating at each meal to better understand what potential opportunities exist for manufacturers to fill necessary gaps and needs.

[Figure 9]



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Challenges of Hydration While Increasing Protein Intake

Food manufacturers who understand the side effects and eating behaviors associated with using GLP-1 medications will gain an advantage. Two common issues are dehydration and gastrointestinal side effects. Most of the surveyed group said they no longer drink sodas because the carbonation makes them feel too full, and they prefer to avoid added sugars and artificial sweeteners. Preferences include still (non-carbonated) beverages sweetened with monk fruit, stevia, natural flavors and small concentrations of fruit juice, like prune juice.

When individuals begin taking GLP-1 medications, physicians recommend stair-stepping or titrating doses to reduce the risk of nausea, bloating, constipation and diarrhea. For some individuals, these symptoms are difficult to manage regardless of dosage. Maintaining adequate fluid intake can also help lessen these common side effects, especially since consumers are eating less and exercising more. Beverage formulations should not exacerbate gastric upset and, therefore, must be easily absorbable and gentle on the digestive system. “Increasing electrolytes commonly found in sports drinks may not be beneficial for this group,” says Clemens, who, as a pharmacist, frequently consults with the food industry on food and beverage product development. He suggests collaborating with specialized experts to create beverages that hydrate, soothe and aid digestion to provide benefits instead of more challenges to this consumer group.

Beverage formulations should not exacerbate gastric upset and, therefore, must be easily absorbable and gentle on the digestive system. “Managing the osmotic equilibrium in the digestive system can help avoid these unpleasant digestive side effects,” says Shelke. “To avoid dehydration problems, food and beverages must be designed not to act as diuretics. For instance, in nature, fruits, vegetables, meats, eggs, dairy and yogurt allow one to ‘eat their water.’ This concept encourages the consumption of hydrating foods that provide naturally nutrient-rich, mineralized water,” she says. “This calls for food scientists to design succulence into their product offerings for rehydration.”

As these consumers increase their protein intake, they must also increase their fluids. “Water helps flush out excess metabolic waste created by the breakdown of proteins and fibers,” says Shelke. “Drinking additional water can help, but drinking well-designed beverages with nutrients and residence time in the stomach can help enhance rehydration. For people cutting back on food intake, consuming beverages that last longer in the stomach than water will allow for greater nutrient uptake.” Shelke reminds food formulators that it is essential to remember the physiology of beverage digestion and how the type of beverage can make a difference, for instance:

- Water is digested in 10-20 minutes.
- Simple beverages like soda, clear juices, black coffee and plain tea are digested in 20-35 minutes.
- Complex drinks like smoothies, protein drinks, thick shakes and pureed soups are digested in 40-60 minutes.



Functional fibers are another ingredient to consider when formulating bakery and dairy products for these consumers. Specific fibers play a crucial role in digestion and support the GLP-1 process. Fibers from resistant starches and beta-glucan, found in barley, oats and rye, naturally support the body's GLP-1 process and contribute to a lasting feeling of fullness.¹⁰ In bakery and dairy products, these fibers can support healthy digestion and blood sugar, as well as increase satiety.

This is an attractive option for GLP-1 users who have stopped taking the medication and can easily understand the benefits of these ingredients for weight management and controlling hunger and glucose levels. Studies indicate that resistant starch and beta-glucan stimulate the intestines to release GLP-1 and peptide YY a few hours after a meal, which helps to reduce hunger between meals.

In conclusion, the GLP-1 consumer sector is expected to continue growing. Product developers who comprehend how these medications influence consumer attitudes, food choices and the obstacles they face in finding healthy, nourishing foods that align with their health objectives can seize opportunities to offer these customers the foods they desire.

There is much to learn and absorb from this emerging group of consumers. As the medications become more affordable and barriers are removed, the number of people taking these medications will likely only grow, and their food preferences will continue to impact the food industry.

Summary of Findings from Corbion Data

General Findings

- A majority of consumers believe their GLP-1 medication has decreased overall food consumption since taking it.
- Healthier lifestyles, including emotional, mental, physical and social health, are more apparent. This includes more exercise and sexual activity.
- In the immediate future, GLP-1 drugs will be in short supply, difficult to afford and will not be covered by Medicare for weight loss.
- GLP-1 consumers spend less on groceries and eat out at restaurants less frequently.
- Approximately 60% plan to use GLP-1 medication regularly for the long term, including weekly dosages greater than a year.
- 30% said they lost the expected weight, 35% expected to lose a little more and 31% expected to lose much more.
- More than 50% are on the medication due to their doctor's advice, while 25% were convinced to take the medicines from personal research.

Taste Changes and Food Preferences

- There is more of a taste difference between savory and less bitter foods.
- 77% report changes in how they eat proteins, including smaller portions, leaner cuts and more variety.
- There is a greater acceptability among protein ingredients such as fava bean, chickpea protein, mung bean and pea protein, while some uncertainty still exists.
- 47% will stay with the dairy brands but want smaller packaging.
- 43% of GLP-1 shoppers are satisfied with their choices of breakfast items and cereals, but they would like smaller packaging and 47% plan to buy them less often.
- They are buying less, eliminating ice cream, salty snacks, processed meats and carbonated beverages and eliminating chocolate.
- In terms of 'sugar reducing' and sodium ingredients, there is greater acceptability among stevia, prune juice and monk fruit, with less aspartame.
- High-fiber tortillas and breads remain a popular choice for sandwiches.

Buying Habits

- A majority are seeking smaller pack sizes for meat and dairy.
- The most influential claim is using "real" ingredients, followed by a high protein, fiber, preservative-free and natural flavor source.
- Low carbohydrate keto is the most influential diet, followed by Weight Watchers, Mediterranean, Atkins and Paleo.
- Most are eating out less at restaurants than ever before.



The GLP-1 consumer sector is expected to continue growing.

Sources

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Corbion partners with the world's food manufacturers to put truly sustainable food solutions to work. Our state-of-the-art ingredient solutions redefine preservation, inspiring and enabling forward-thinking companies to create and prolong all the hallmarks of freshness and safety — like texture, taste and antimicrobial control — that shape delightful eating experiences, all while protecting the planet future generations will inherit. We deliver both tangible and intangible value, helping our customers craft delicious, nourishing foods consumers can trust. At Corbion, our priorities as consumers shape the products we help make possible — products that allow our families, our friends and our customers to thrive.