

[APPLAUSE]

JAMY ARD: Good morning. I love coming to talk to surgery groups because you guys get up so early and get the day started. So what I want to do is maybe spend about 50 minutes trying to give you an overview of the landscape of obesity treatment and try to make this relevant for you from the perspective of not that you're going to be treating obesity per se, but that when you're talking to your patients about the benefits of weight loss and the prospects of losing weight to improve your ability to do your job, that you have a perspective by which to talk to that patient regarding some of the issues that they may be dealing with, as well as some of the potential treatment modalities that may be relevant for them. So let me take you through obesity and its impact on health and sort of give you a general overview of sort of where we are from an epidemiology standpoint. And then we'll talk about current treatment practices and approaches and then kind of end with some of what's new and evolving in terms of therapy options.

So just to orient everyone, when we're talking about obesity, we're using BMI as our measure of excess adiposity. I mean, that's really what we care about is what's your excess body fat. And BMI is sort of a poor man's measure of being able to help you understand how much excess body fat an individual has. So it gives you basically a measure of how much you should weigh based on how tall you are.

So in this instance, you can be 300 pounds, but you have to be seven foot tall in order for that to work. You can't be five six, like myself, and 300 pounds. So looking at body weight itself is not necessarily helpful. But in the context of BMI, it's very useful.

So when we're talking about obesity, BMI of 30 or greater is considered obese. 25 to 29.9 is considered overweight. All right? And severe obesity or extreme obesity, you're talking about a BMI of 40 or greater.

So why do we care about it? Well, if you've watched the news at all any one time in the year, you will have heard some story about obesity in the nation, either in children, adults, all across the spectrum. But this is what's happened over the past 25 years in terms of body weight. We've gone from what looks like an all blue map and prevalence of 10% to 14% across the nation to prevalence of nearly one in three individuals being obese.

And I know that clinically, you're seeing this more and more in your practices as individuals are having more and more problems related to that. When you look at the increase in obesity, the rate of increase over time, I mean is fairly dramatic. There aren't too many diseases that have increased in terms of prevalence at this rate over this period of time.

What's causing this problem? Well in general, if you think about it, you don't have to do much in order to become overweight in today's society. If you wanted to, you could be very successful, you could be a very productive person at work, but you don't have to physically exercise. You don't have to exercise. And you don't have to work for your food because you can pull out your phone and order up enough food to feed everybody in this room and it would be delivered straight to you.

So the days of having to work for things in terms of food or having obligations to be physically active, those days are gone. And we have access to food. We can walk out of this building in any direction and go five minutes and get whatever type of food we want. That's a very different type of environment. And it creates an environment that makes it very easy for people to gain weight.

So you have to consciously monitor this situation and think about it. And most of us don't grow up thinking about actively managing our caloric intake. We don't have any type of internal mechanism that tells us that milkshake that I just had has 500 calories so now I should restrict my caloric intake for the rest of the day. There's nothing like that that happens. In fact, that milkshake really sort of makes us want to have the fries and the burger go along with that.

So the other thing that I think is happening is that fewer and fewer people are actually being told you have a problem. You have a medical problem in terms of your body weight. You are obese. There have been studies that show that as many as half of the individuals who go see their primary care providers don't have a conversation about their body weight.

And so you end up seeing the result of that when you're consulted for osteoarthritis or hip or whatever the case may be. And you see that individual now who's been 10 years severely obese and they have degenerative joint disease. But no one's ever really talked to them about their weight. So that's an opportunity for us to do better from that perspective.

You know that obesity drives a number of significant comorbidities and that is related to any number of cardiometabolic issues-- heart disease, diabetes-- but also cancer, so increase circulating inflammatory factors, increase growth factors, increase the risk of cancers in a number of different sites. It can affect hormonal balance from menstrual abnormalities. And then you have the physical impacts of obesity. So beyond the cardiometabolic issues, sleep apnea, osteoarthritis, even reflux has a physical component in terms of the increasing pressure at the GE junction.

So when you look at overweight and obesity, the other piece of the pie or the puzzle here is looking at the distribution of the weight. So it not only matters what the BMI is, but it also matters sort of how that weight is distributed. If an individual carries more of their weight in the midsection, then they are at higher risk, simply because of the fact that a waist a conference that's abnormal has an independent associated risk with that. So when you combine that with BMI, that also gives you more information about that individual's risk of cardiometabolic disease.

Certainly when you're in the overweight category, it can be very important. So individuals who are say BMI 27, but it's a male, and they have waist a conference greater than 40, so that means that most of their weight is probably centered in the midsection, that person metabolically may look very, very much different or even worse than someone who might have a BMI of say 30 or 35 but does not have the same waist circumference as that individual with the BMI of 27.

The ultimate reason why we care about this is because we know that an elevated BMI is associated with increased mortality. And this happens throughout all age ranges. The shape of the curve starts to flatten out a little bit as we get older.

So we know that maybe being overweight in your 60s, 70s, and 80s is probably an ideal body weight or BMI at that age range. But certainly we know for younger individuals, having a body mass index below 25 seems to be clearly in the best. And then as we go up beyond 25, we start to see a fairly consistent, almost linear, increase in risk of mortality.

The other major thing that I think is going to have an impact on all of us in the health care profession is the risk of diabetes associated with obesity. We have quietly sort of been developing this epidemic of diabetes that's gone right along with the epidemic of obesity. And projections are that somewhere by the time 2050 comes around, we could be looking at somewhere between one in four to one in three individuals having type 2 diabetes.

It's already affecting adolescents at an earlier age. And certainly individuals are living longer with diabetes. So we have more opportunity to see some of the downstream effects of that. So if for no other reason we do something aggressive related to obesity, it should be because we want to limit our risk of diabetes and the impact that that will have on the health care system.

We spend a lot of money on obesity. As you well know, individuals who are obese tend to stay in the hospital longer. They have longer recovery periods. Rehab is slower, much more complicated. And even from a wellness perspective in thinking about employee health, individuals who are obese have more absenteeism, presenteeism, and they cost the health plan more.

So that's the problem. What do we try to do about it? The basic issue that we have to deal with is we have to change the energy balance equation. So it's calories in minus calories out.

And we're trying to shift that. We're trying to change it such that individuals are burning more calories than they're taking in. That's the bottom line. At the end of the day, we have to be able to create that shift in the energy balance equation.

Now, it's not so easy to do that on a consistent basis over a long period of time and how people maintain that. But we've got a couple of different components of that energy out equation. Resting energy expenditure or your metabolism accounts for about 60% to 70% of your total energy expenditure. So when individuals tell you, my metabolism may be a little bit slow because of my thyroid or because of some other glandular issue, they could be right. But the majority of my patients that I see, and we measure metabolic rate on a regular basis, the majority of my patients have what we would consider to be a normal metabolic rate.

Now, there are some instances where we do see individuals who have a lower than normal or lower than expected resting energy expenditure. Those types of examples might be individuals who work third shift, for example, individuals who are not sleeping well, who have an altered sleeping cycle. Individuals who are taking steroids may often have an impact on resting metabolic rate, simply because they are losing lean mass. And their lean mass accounts for a lot of the resting energy expenditure. So there are some examples or issues that may have an impact on resting energy expenditure. But again, the majority of individuals have a normal resting metabolic rate.

The part that's in your control is the activity energy expenditure. This is exercise. This is moving around. This is the I'm going to decide to park farther away and walk rather than circle the parking lot for three minutes so I can get the prime spot right up front.

The difference here is about 20% of your total energy expenditure can be related to activity. And this is the one variable that people have in their direct control. Obviously, there's a vicious cycle that people can get into and you've seen this in your practice where individuals who start gaining weight because of, say, an injury.

I saw a woman yesterday had an injury to her knee, was pretty active, couldn't exercise, didn't compensate in terms of her energy in on that side of the equation, started gaining weight. That made the knee worse, still couldn't exercise, continued to eat because she was depressed, and you can see how that sort of spirals out of control. So the activity energy expenditure component of it is really sort of critical to this process in terms of creating weight loss and also in terms of weight maintenance.

The other piece of this that people don't often think about is the thermic effect of food. So it takes work just to digest the food that you eat. And so we often encourage people to eat on a multiple small meals per day, frequently throughout the day, simply because you're gaining about 10% of your total energy expenditure simply by revving the motor and putting fuel in through the digestive track to help with the process of digestion. So you're expending energy with that process rather than taking in all of your calories at one large meal at the end of the day, for example.

Energy in, the two ways to decrease that, we can consume fewer calories or we can change the absorption of those calories. The most common way that we deal with this is by trying to limit caloric intake. But malabsorption is part of a process that can be utilized, either from pharmacotherapy or from a surgical perspective.

Now, the key with obesity I think, is that all too often, people are choosing the wrong type of treatment plan for their issue. They sort of approach this sort of generically and say, well, I need to lose weight. So I'm going to cut my calories and exercise more and voila. But the issue really is a little bit more nuanced than that.

And I use cancer as an example. Certainly you can say to someone, you have cancer. But that's very vague. It doesn't mean very much from a treatment perspective. It's a multi-faceted issue.

There are cancers of specific sites. And those specific sites and types of cancers require different treatment strategies. And you have to have a certain skill level and knowledge base and resources in order to be able to engage in that treatment.

So for weight loss, it's really no different. There are different strategies and approaches. And what we're trying to do in our practice is match the strategy to the particular problem that the individual has.

Another example would be if I said, well, you're a firefighter. And you're taught that liquids help to extinguish fires. But you wouldn't use gasoline as an option to help extinguish the fire. So again, there are any number of different strategies that people can employ for weight reduction. The key is helping them find the one that makes sense for them.

So one of those ways to think about what's the right treatment strategy is to think about how did this individual get to this point in terms of their weight gain? So I look at three different categories. One is sort of simple-- aging in metabolism. So over time as we get older, our metabolic rate declines.

It's a normal part of the aging process. And so if you don't make adjustments in terms of your caloric intake and your physical activity and you just simply let the course of aging take its place, you could pick up a pound or two a year. And you do that over a 20-year period, you can be looking at about a 40-pound weight gain. And that could take you from being normal weight to obese.

And that's what is very common in the US in particular over the holidays. I think the estimate is that we typically gain three to five pounds. We lose about half of that in January. And then we kind of keep stacking on top of that each year. So it's not an uncommon scenario to see people do something of this nature, inactivity with increased intake.

So just having that basic energy balance equation go out of balance, either because of injury or some type of circumstances that prevent or change the activity level-- people go from a very active job to a much more sedentary job, any of those types of changes can make a difference. And if you don't compensate, again, you don't have internal mechanisms that tell you OK, you didn't burn as many calories today. Cut back on what you've eaten. If you don't compensate in terms of your caloric intake, you can very easily see yourself picking up weight.

And then there's really sort of the last category, which is really related to cues around food and eating and satiety and hunger, where individuals are having persistent and excessive intake. And this is almost independent of their level of physical activity. They may be very active but having lots of issues related to excessive caloric intake.

The other things that we take into consideration are what are the other comorbidities that they're dealing with, especially if they have poorly controlled comorbidities that may be leading to additional treatment strategies that might be compounding weight gain. And when we're directing our therapy in terms of the type of treatment strategy, we want to be sure that the treatment strategy that we are using is allowing us to help to reduce the co-morbid conditions such as a diabetes, pre-diabetes, metabolic syndrome, for example.

Here's some other things that you may recognize in some of your patients or briefly talk to them about in terms of if you see rapid weight gain or problems with that individual really struggling to be able to get their weight under control. Food addiction is really sort of a new and developing concept. But you can imagine that for some people, they start off their conversation with me is I don't smoke. I don't drink. I don't gamble.

But food is my thing. It's the my one vice in life. And they treat food as their substance of choice.

And they have a lot of behaviors around food that are very similar to someone who might be seeking illegal drugs, for example. So they hide food. They eat in secret. They binge and they get a thrill just from the anticipation of bingeing. They have a lot of guilt immediately after such episodes.

And they understand that this is harmful. But they can't seem to keep themselves from engaging in the behavior. So all of those things are very sort of similar to someone who might be dealing with alcohol abuse or some other chemical substance.

The other thing that you'll hear people talk about is they feel like they value food a lot more and they're very responsive, hyper-responsive, to thoughts about food. So you know, it's OK to like chocolate cake. But when you say I love chocolate cake and you put that emphasis on the love part and you think more highly of the chocolate cake than you do your spouse, I mean, that's a problem. Some of those issues become very apparent and relevant as we're engaging in treatment with individuals.

The other things that we see often are things like binge eating, bulimia, and night eating syndrome. And I'll just say a word about night eating syndrome because a lot of your patients may be doing this. And you might simply just ask, do you get up at night to eat?

And you might be surprised at the percentage that will say well, sure. Yeah. I get up around 1:00 or 2:00 and I have to get a bowl of cereal. Or I go through and get some peanut butter and some carbs and then I can settle back down and get back to sleep.

But night eating syndrome is basically individuals who are getting somewhere around a quarter of their total caloric intake after their last meal for the day. And in individuals who are seeking treatment at a weight loss center like ours, the prevalence of individuals who endorse this is probably somewhere in the 20% to 25% range. So it is not uncommon.

And you would be surprised at the amount of calories that people are consuming in the middle of the night as a way to help themselves sort of feel better, get back to sleep. There may be some associations with anxiety and depressive disorders in these individuals. But understanding some of these complicating factors certainly makes a difference in terms of our approach to treatment.

So we look at complexity of the disease and then try to think about how do we match the treatment strategy with that. So someone might be low complexity where they don't have any chronic disease issues. They don't have any risk factors that are poorly controlled. Let's say their weight gain has been very gradual over time. And we don't identify any behavioral concerns.

That would be a low risk, low complexity individual where they may not need intensive monitoring and psychotherapy. Medication, pharmacotherapy may not be necessary. We might just need to give them a little structure and point them in the right direction.

In the middle, we have individuals, maybe they've got some chronic disease. But their risk factors are controlled. Maybe they have a larger amount to lose. But overall, we're not overly concerned about major behavioral issues.

And then on the high complexity end of things, maybe they've got a large volume of weight to lose. Maybe they are in a rapid weight gain state because of some of these behavioral issues in terms of eating disorders. And there might be some potential contribution of medications to their weight gain. So they're on high doses of insulin, for example, or they're on steroids, anti-psychotic medications, things that might complicate their ability to effectively lose weight because of the treatment strategies for other co-morbid conditions.

So treatment approaches fall into three categories-- surgical interventions, pharmacotherapy, and diet and exercise. Ultimately, behavior modification is the key to what we're trying to accomplish with these different strategies. If you go back and think about the energy balance equation, what we need the patient to do is to alter that equation.

We can't do it for them. And so we have to help them change their behavior, modify their behavior. And so that becomes the critical piece at the bottom of this pyramid.

Pharmacotherapy is sort of our next level of intervention. And surgery is sort of third tier. But this is increasingly within the context of other social and environmental types of interventions that are beyond the scope of what we're talking about today. But hopefully those types of changes will make it easier for some of these things to stick for individuals, sort of going against that obesogenic environment.

So let's talk about surgical intervention quickly here. So typically, it's indicated for individuals with BMI of 40 and greater without comorbidities or 35 and greater with comorbidities. And you have basically three options for surgery that are used more commonly-- the adjustable gastric band and that then also has an indication for BMI of 30 or greater if they have diabetes, Roux-en-Y gastric bypass, and then the vertical sleeve gastrectomy.

This is what a Lap-Band looks like. You have an access port that's used to allow saline to go in to tighten or take out saline to loosen the band. And basically you're creating a pouch, a small pouch, that restricts intake. And on average, what you're seeing is about 40% to 50% excess weight loss.

You can explant the device. You can take it out if you suffer complications down the road. We are seeing less use of the band nowadays, simply because the amount of weight loss is not what we thought it would be. And longer-term complications seem to be more and more problematic.

Really, the gold standard of treatment for surgical weight loss is the Roux-en-Y gastric bypass, where you're creating a bypass of the duodenum and making a small pouch out of the stomach. This leads to restrictive intake because of the small pouch, but also some malabsorption because you're bypassing the first part of the duodenum. Typically, you're going to see about 60% to 75% excess weight loss in this type of surgical procedure.

It is not easily reversed. And you have a lot of issues with potential down the road complications related to malnutrition because of the lack of absorption of minerals and vitamins. So individuals who have a procedure like this, they are going to need to be on lifelong mineral vitamin supplementation.

The sleeve gastrectomy is actually the one procedure that is increasing in the number of cases that are being done in the US now. It is really sort of replacing, I think to some extent, the laparoscopic band. And the reason being is that the weight loss seems to be slightly better than what you might see with a band. In some series, it's been comparable to that seen with the Roux-en-Y gastric bypass.

And you basically are creating a small sleeve with the stomach, taking off the greater curvature. And it's restricting, but it does not create any type of malabsorption. So you get a little bit of the restrictive component with say a band or a Roux-en-Y but without the malabsorptive component that the Roux-en-Y has. 60% excess weight loss is what we're seeing with fewer complications and long-term issues.

So if you did a head to head comparison, really what you see is the sleeve is sort of in the middle in terms of disease improvement and weight loss, pretty good in terms of operative risk and long term risk. Gastric bypass gives you the most in terms of weight loss and disease improvement, for example, like in diabetes. You see fairly rapid improvement in diabetes that may be related to something beyond just the calorie restriction and weight loss that occurs. This is from the Swedish Obesity Surgery Study where they followed individuals for over 10 years at this point, and shown that the curves of weight loss look like this for different types of surgery, where you see gastric bypass with the greatest amount of weight loss, banding with about half of the volume of weight loss as the gastric bypass, and vertical banded gastroplasty, which is kind of an early precursor to what we're doing now with the sleeve sort of being in between.

Contraindications for surgery. So if your patients are talking to you about, well, I should I have surgery, but maybe they've been in and out of the hospital for a psychological issues or psychiatric issues, they have active binge eating or any type of drug or alcohol abuse active, any of those types of things are hard contraindications. And then typically, the team will evaluate them for other relative contraindications or risk to sort of see if they might be a reasonable surgical candidate.

One of the things to remember about surgery it is not a cure for obesity. It is a tool that that individual can use to help them modify their behavior. But we often see individuals who have regained weight after a surgical procedure. So it is not the definitive procedure that a lot of people might think that it is.

So if that individual does not continue to modify their behavior long term, they will be at risk for weight regain. So about 50% of individuals regain 50% of their weight at five years. And unfortunately, we see people who've regained 100% of their weight in a few years or maybe they never achieved any significant weight loss from the beginning.

One of the things that surgery does is it really sort of forces an adaptation. It gives you immediate feedback. And that feedback is related to the amount of food that you're taking in, as well as the type of food. You have to slow your eating time. You have to be much more conscious.

I had a patient describe it to me like this once before. He said, before my surgery when my body said I was full, that was more like a suggestion. After surgery, that changed to an emphatic statement that I couldn't ignore. So if he had one more bite than what he needed, he would end up in the bathroom either vomiting or he'd be very sick for the rest of the day. So it's sort of this aversive conditioning that ends up happening that the patient just cannot ignore.

So as I've said before, future of surgical intervention, sleeve gastrectomy is on the rise. Laparoscopic adjustable gastric band is on the decline, mostly because of the variable weight loss success with that.

So pharmacotherapy options that we have for medication are starting to increase. There at least a couple of new medications on the market now. Medications are indicated for individuals with a BMI of 27 or greater with comorbidities or BMI of 30 without comorbidities. Again, as I've talked about with surgery, medications don't eliminate the need to make a lifestyle change.

But when I talk to patients about the option of medication, I say this is going to help you stick to your plan a little bit better. This may take food from being top of the mind. So a lot of people are thinking about food all the time.

When they get upset, they think about food. When they're happy, they think about food. When they take a break, they think about food. And so what a medication might do is help decrease the sort of top of the mind thoughts about food and help them sort of get through the day without feeling like they are constantly trying to eliminate those thoughts or restrict themselves.

We've had anorectics or appetites suppressants around for a long time. Phentermine, very commonly used appetite suppressant, has been around since the 1950s. It's typically approved for short-term use, even though we can use it for longer term use off label as a result of that.

There no significant risk of addiction despite the warnings. It's an amphetamine congener. So it means it looks like an amphetamine chemically, but does not have the same benzene structure that amphetamines have that create the addictive component.

It decreases appetite. But probably more important for me, it actually lessens the decline in resting energy expenditure that happens with weight loss. So when you restrict calories, your body says, hold on. I need to preserve myself. So I'm going to lower my resting metabolic rate because otherwise I would waste away. What phentermine does, it helps to prevent some of that decline in resting metabolic rate so that the weight loss when individuals are on phentermine actually tends to be a little bit more consistent, a little bit longer term, in addition to decreasing the appetite. Common side effects-- things like dry mouth, constipation, small increases in blood pressure and pulse.

Orlistat is a drug that is used for malabsorption. And it does this by inhibiting intestinal lipase. So it's a fat-blocker essentially. You get about a 3% greater weight loss than placebo. It's available over the counter.

The problem with this medication is that if you block too much fat, you get a lot of bad side effects. It's sort of the Antabuse of weight loss medicines. So if you overdo it, then you're going to have problems with oily spotting, fecal urgency, fatty stools, those types of things. And then long-term use, you have to be concerned about fat soluble vitamins being absorbed.

Medications that don't have an indication for weight loss but are associated with some decreases in weight, things like exenatide or pramlintide, some of your antidepressants like fluoxetine or bupropion, topiramate-- useful for individuals especially some who might have a binge eating disorder. So the some of the newer drugs that are available, naltrexone and bupropion is a new drug that's coming down the pipe. The name of that drug is going to be Contrave. Should be available maybe within a year or so.

Phentermine and topiramate is known as Qsymia. This is now available. And lorcaserin, which is known as Belviq, is now available as well. And these drugs are approved for long-term use, meaning for Qsymia and lorcaserin, they've been studied for two years.

This is what the data looked like for the phentermine-topiramate combination. And this is out two years. And you see basically individuals are maintaining a weight loss of somewhere around 10% at two years. And that's about 8% greater than placebo.

The combination starts off at a low dose. And then we increase it to a recommended dose after a couple of weeks. And then you have a second dosing tier if necessary to help with additional weight loss.

The side effects are really what you might expect if you combine phentermine with topiramate. So you get some of the cognitive issues and paraesthesias that, say, a topiramate may have. You also get dysgeusia.

So people have altered taste. They say, you know, my carbonated beverages taste like metal, those types of things. But usually, the individuals if they're able to tolerate it through the first several weeks, then typically they accommodate to the side effects.

Lorcaserin is a serotonin receptor agonist. It improves satiety. It appears to be very specific to 5HT_{2C} receptors. And if you knew anything about fen-phen in the past where that was a serotonin drug, but it led to valvulopathy and pulmonary hypertension because those are non-selective.

And so this drug, lorcaserin, appears to be very different in terms of its selectivity and does not appear to be associated with valvulopathy. The most common side effects are headache, nausea, dizziness, fatigue, some very general types of symptoms. This is just showing that over time, there were no changes in regurgitation as measured by echocardiogram.

Naltrexone-bupropion, I find this to be a very interesting combination. So bupropion increases dopamine levels and improves appetite regulation, decreases cravings. Naltrexone is a drug we often use for those who have addiction issues related to narcotics or alcohol dependence. And what it does is actually decreases the hedonic response to food intake that individuals may have.

And so this drug is being studied now. They're doing cardiovascular outcome trials with that. But it looks to be superior to placebo, creating somewhere around 8% weight loss over a period of a year.

Ultimately, you have to change the behavior in order to get people to lose weight. And an example of this is I can give someone a prescription for weight loss medication. But that medication won't make them want to exercise, for example.

It may decrease their caloric intake. But if they're not physically active, we're only going to get a small amount of weight loss or not see the full effect of what we want to occur. So one of the challenges that we have to deal with in terms of trying to provide this behavioral counseling for individuals is to figure out how to scale it up, how to make sure that it's effective for that individual, and tailor it for that individual instead of a one-size-fits-all approach.

Some of the newer things that people are thinking about are brief interventions with, say, a medical assistant, where someone in the clinic might provide some coaching for that individual to help them move along with making progress in terms of their weight loss. Remote counseling is also going to be more available. So individuals are using Skype telephone counseling, internet counseling, those types of things to help move individuals along with their treatment progress.

Another interesting thing that's being developed now is people are looking at intermittent calorie restriction, where they say, well, someone may be able to limit their caloric intake for three or four days out of the week, two or three days out of the week, and then eat whatever else they want for the rest of the week. And if you set the prescription at the right calorie restriction, what you see is on average, individuals are able to accomplish a similar reduction in calories as individuals who might be prescribed a daily calorie restriction. But this is very early. We need additional research in terms of longer-term trials and larger samples.

Stepped care is another interesting modality that people are starting to look at where they're thinking about instead of applying the same strategy to everyone who walks in the door, giving individuals a limited approach, seeing who does well with that. Again, some people just need to be pointed in the right direction, maybe given a little bit of accountability, and then they're off and on their way versus spending the whole bank on that individual who would have done well without that and saving those resources for someone who might really need that higher-level approach.

So what's the future? I think we're moving more towards the chronic care model with trained specialists and programs like ours where we are part of the long-term chronic care team for that individual patient. We now have more drug options available that target central and peripheral targets.

We're combining drug and surgical options to look at long-term maintenance of weight loss. And we're trying to figure out the best ways to target behavioral lifestyle interventions for effective delivery and tailoring of those interventions. So I'll stop there and see what questions we have.