MS. CURTIS: Good afternoon, everyone, and thank you for joining today's webinar, "Physical Activity: Making Sense of Current Research, Persistent Myths, and Common Barriers." I'm Leslie Curtis, Director of the National Institute of Diabetes and Digestive and Kidney Diseases' Weight-control Information Network. The National Institute of Diabetes and Digestive and Kidney Diseases, or NIDDK, conducts a broad range of research in the areas of diabetes; endocrine and metabolic disorders; kidney and urologic concerns; digestive diseases and nutrition, including liver disease, obesity, and physical activity. So, this webinar—today's webinar—is quite relevant to NIDDK's portfolio. So, before I introduce our speaker, Dr. Jessica Unick, I will review some of the learning objectives and mention some other details. So, at the end of our webinar, we hope that you will be better able to, one, identify and understand the national Physical Activity Guidelines, recognize several common physical activity myths, acknowledge barriers to physical activity participation, and develop strategies that will help your patients overcome those barriers and identify—and hopefully use—the physical activity Web content and tools from NIDDK and other sources that we mention. I want all of you to know that the webinar is being recorded. The video and slides will be posted within 2 weeks, and attendees will receive an email once the video link is up. And also, at the end of the webinar, we will be sending you a survey, and we kindly ask that you complete the survey because it will help us in our future planning, as well as ways in which we can improve future webinars. So, let me now go and introduce Dr. Jessica Unick. Dr. Unick is an assistant professor of psychiatry and human behavior at the Brown Alpert Medical School and the Miriam Hospital's Weight Control and Diabetes Research Center. She earned her Ph.D. in exercise physiology from the University of Pittsburgh and completed a 2-year NIH-funded postdoctoral fellowship in cardiovascular behavioral medicine at Brown. Broadly, Dr. Unick's research focuses on the role of physical activity in weight control, developing effective behavioral weight loss interventions to improve long-term weight loss maintenance. She has been awarded NIH grants to examine the influence of exercise on energy composition and stress-induced overeating. So, without further delay, Dr. Unick?

DR. UNICK: Thanks, Leslie, for the nice introduction. Thanks to you all for being on the call today. So, I just wanted to start out with a fun cartoon because I think every talk needs a good cartoon. So, this is a patient going to the doctor with a rash on his back and the doctor is saying, "It's not a rash, it's moss. You need to start being more active than a tree." And the reason that I start out with this today is because I think that it's actually a nice segue into the discussion around how much physical activity is needed to achieve health benefits. And in order to answer that question, what we can do is we can refer to the national Physical Activity Guidelines. So, before diving into those guidelines, I just wanted to provide everyone with a very brief summary of how these guidelines came into existence, and I won't bore you with all the details, but I think it's really important to recognize that the field of physical activity and health is still relatively young. And although we are all probably well aware of the fact that physical activity is good for us, it actually wasn't until 1992 that a lack of physical activity was classified as a major risk factor for cardiovascular disease. So, as you can see here, it wasn't actually until 1995 that the CDC and the American College of Sports Medicine recommended—came out with physical activity recommendations for improved health, and it wasn't until 2008 that the federal government issued its first-ever Physical Activity Guidelines. So, I've provided the link to those guidelines here because these are the guidelines that we currently go by, but I did also want to point out the fact that these guidelines are set to be updated in 2018, and you can actually track the progress of these second edition guidelines on this website that's provided on the screen as well. So, what are those Physical Activity Guidelines? So, for substantial health benefits, it's recommended that at least 150 minutes per week of moderate-intensity exercise or 75 minutes per week of vigorous exercise be performed, or the guidelines state than an equivalent combination of both is also good as well. However, the guidelines further then go on to say that for additional and more extensive health benefits, 300 minutes per week of moderate-intensity or 150 minutes of vigorous-intensity physical activity are needed or, again, a combination of both. And then, one of the other important points from these guidelines that I wanted to make everyone aware of is that the guidelines state that aerobic activity should be performed in episodes of at least 10 minutes, and preferably it should be spread throughout the day. And there's actually a good body of research

demonstrating that multiple short bouts of physical activity are just as effective as a single longer bout of physical activity when we talk about improving cardiorespiratory fitness, lipid profiles, blood pressure, insulin, glucose, and even weight control. So, in one slide, I just wanted to summarize some of the data that support these guidelines. So, these are data from a recent meta-analysis looking at the mean risk reduction seen in physically active individuals, compared to inactive individuals. And here, physically active was defined as greater than 150 minutes per week of moderate to vigorous physical activity accumulated in bouts of 10 minutes or more. And what we see first in this highlighted box is that among individuals who are physically active, they have about a 30 percent risk reduction for all-cause mortality, compared to those who are inactive. What's interesting to note here is that this risk reduction seen with physical activity is actually substantially greater than what's observed through the use of statins. So, when we look at cardiovascular disease, we see a similar pattern in that physical activity reduces the risk of developing cardiovascular disease by about 33 percent, and this again is better than statins, which only reduce the risk by about 25 percent. So, I think these are good data demonstrating that exercise really is medicine. And if we just move through this figure here, we can see that the risk of stroke, hypertension, and colon cancer are all reduced by a similar magnitude and that the risk of breast—developing breast cancer if you're physically active is a little—is only about 20 percent. But what's really interesting to note here is that if you're physically active, compared to somebody who's inactive, your risk of developing diabetes is reduced by about 42 percent, which is quite large. We also know—the data aren't shown here, but we also know that physical activity has a similar health—has similar mental health benefits. For example, it can reduce the risk of depressive symptoms by about 30 percent or even lower one's risk of cognitive decline that's often seen with aging as well. So, there are a few other important points that I wanted to pull out from these guidelines and just briefly mention today, and the first is that inactivity should be avoided, and some physical activity is better than no physical activity. So, adults who participate in any amount of physical activity gain some health benefits. Another one of the points from these guidelines is that the benefits of physical activity far outweigh the possibility of adverse outcomes. So, oftentimes people will say that they're afraid to exercise, they're afraid of getting hurt, but the

guidelines state that the benefits are much better—that the benefits of the physical activity definitely far outweigh those adverse outcomes. And then finally, additional benefits occur as the intensity, frequency, and duration of physical activity increases. So again, I just wanted to point you to some data that supports this statement that's found in the guidelines that some physical activity is better than no physical activity and that greater benefits are observed when more than 150 minutes are achieved. So, these are data from a review study which summarized findings from 10 different studies, and they examined the impact of physical activity on all-cause mortality. So, you can see here hours per week of moderate to vigorous physical activity is on the X axis, and relative risk for all-cause mortality is on the Y axis, and what we see is that the greatest risk reduction—or you can see that the steepest slope—is actually observed when a very inactive person goes from little activity to about 1.5 hours per week of physical activity. And I drew the red line here to indicate where the recommended level of physical activity is, so it's about 2.5 hours per week, and this tells us that some physical activity is better than no physical activity, even if it's below the national Physical Activity Guidelines. And then, we can look at the other end of the spectrum as well. So, we can look into the right of that red line, and we see that beyond 2.5 hours per week there are additional gains in physical activity as you continually do more and more, and that there doesn't appear to be any upper threshold where the benefits end, although the magnitude of risk reduction begins to diminish at higher levels of physical activity. And the last point that I wanted to just mention from these guidelines is that these guidelines, in addition to aerobic exercise guidelines, there's also guidelines related to muscle-strengthening activities, and these guidelines say that these types of activities have additional health benefits and that they should be moderate or high intensity and involve all major muscle groups and should be performed greater than 2 days per week. So, in today's talk I'm not going to focus on the muscle strengthening part of these guidelines, but I just wanted to make sure that everyone was aware of that as well. So, the question then becomes: how do we use all of this information that is in these guidelines, and how do we help prescribe exercise to patients? And unlike this cartoon, we actually do need to give patients a little more guidance than just telling them to exercise. So, in the exercise physiology world, we like to use what we call the FITT principle for prescribing exercise to patients,

where the “F” stands for frequency or: how often should someone exercise? And the guidelines state that the exercise should be preferably spread throughout the week. So, if it’s greater than—if you’re doing vigorous intensity physical activity, preferably 3 days, and moderate intensity exercise, preferably 5 days, and the reason being is that I think that helps if you do it more frequently; it also helps to become a habit as well. So, the “I” of the FITT principle stands for intensity, or: how hard should somebody exercise? And, as we said before, the intensity recommended in the guidelines is moderate to vigorous intensity activity. So, I just wanted to spend two slides here just talking about what exactly is MVPA, or moderate to vigorous intensity physical activity? So, there are several ways that MVPA can be prescribed or measured, and the first is that it’s often prescribed relative to one’s fitness level, so this is often done by either measuring somebody’s maximal heart rate doing a maximal exercise test, or it could be done doing a heart—like figuring out their targeted heart rate zone based upon different equations used to estimate heart rate max. And what we see here is that moderate intensity is typically about 50 to 70 percent of heart rate max, where vigorous intensity is about 70 to 85 percent heart rate max, so that’s one way to prescribe physical activity intensity to patients. However, I also did want to just make everyone aware of the fact that in lots of studies, or specifically population-based studies, it’s difficult to assess an individual’s fitness level or even measure their heart rate, so therefore, specific thresholds have been identified that define MVPA for all individuals, and this is independent of their fitness level. So, this is done using a term that we call MET, or metabolic equivalent, where one MET is equivalent to rest for all individuals and then moderate intensity is defined as 3 to 6 METs, meaning that an individual burns 3 to 6 times the number of calories at this threshold, compared to rest. So that, you can see the number of calories differs based upon an individual’s initial body weight, and vigorous intensity is defined as having a MET value greater than 6. So, oftentimes this is what’s shown in the literature and this is actually what most of the guidelines are based upon. However, the easiest way to probably prescribe exercise intensity is what we call using the Ratings of Perceived Exertion Scale. So, there are several of these scales out there and I just wanted to show everyone an example of one of those. So, you can see here this is a 1 to 10 RPE scale where you can see that the numbers correspond to different levels of effort, so when using the

RPE scale what we do is we want the person to rate how hard they feel they're working at the moment. So, you don't want them to think about their breathing, you don't want them to think about their legs. You want them to think about their total overall body effort, and generally RPEs correspond pretty well with heart rate. So, moderate intensity on the RPE scale would be between 4 and 6, so this means that an individual is probably breathing a little bit heavily, they can hold a short conversation but it's still somewhat comfortable but becoming noticeably more challenging, where a vigorous intensity activity on our RPE scale would be about a 7 to 8, where there's borderline uncomfortable. The person may become a little short of breath but they can still speak a sentence. So, one other thing that I just wanted to mention with intensity is the concept of what we call the Overload Principle. So, this means that in order to continue to see gains in fitness, you need to continue to challenge your body. So, somebody who's beginning to start out on an exercise program, they may start out walking, let's say, 3 miles an hour, and this is moderate intensity for them. However, as they become more fit, in order to continue to see fitness gains, they're going to have to increase that intensity, so they may need to begin walking at, let's say, 3.5 miles an hour or 4 miles an hour, so that's just something also to take into consideration when we're talking about intensity. The first "T" of FITT stands for type, so what type of exercise should I do? And this is often a common question that many people ask and I always like to answer it as: do the type of exercise that you will actually do. So, for most people, that's something that they enjoy doing, and there's actually some literature that suggests that exercise enjoyment predicts future exercise adherence. One of the other things that I think is important to mention is that the guidelines specifically talk about more structured exercise, so moderate to vigorous intensity physical activity in 10-minute bouts, but it's also important to get into what we call lifestyle activities. So, these would be things like we always hear about: parking further—parking your car further from the door or taking stairs instead of the elevator, things like that. So, both lifestyle exercise physical activity and structured exercise should be important components of this regimen as well. And then finally, there's a little bit of evidence to suggest that people who have variety in the type of exercise that they do, that they may be more likely to do greater amounts of exercise, so that's something to consider as well. And then finally, the second "T" stands for: how long

should I exercise? And like we stated, the guidelines state that 150 minutes of moderate to vigorous physical activity are needed for health but that greater, improved benefits can be seen with 250 minutes per week. These can be accumulated in short bouts or long bouts, and I often get the question: is it better to do it in the morning or in the evening? And it doesn't seem to make a difference whether exercise is performed at either time point—it's again, more likely an individual preference and when the person will do it. So, I just wanted to transition for a little bit and just move on to a few slides that talk about some statements that I often hear when talking with patients and just kind of thinking about whether there's truth behind these statements or whether they are indeed false. So, the first one that I'll start out with is this statement that says: to achieve optimal health benefits from physical activity all I need to do is meet the recommended amount of moderate to vigorous physical activity. And while there's some truth to this, it's actually false. And to explain this statement and why it's false, it's important to make the distinction between physical inactivity and sedentary behavior. And it actually wasn't until somewhat recently that these two terms have been used somewhat interchangeably. However, physical inactivity refers to not achieving the recommended Physical Activity Guidelines, while sedentary refers to excessive amounts of sitting despite whether or not somebody meets the guidelines. So, there's actually more and more research coming out suggesting that being an active couch potato is not good for you. So, an active couch potato would be somebody who meets the physical activity guideline of, let's say, 150 minutes per week, but then sits for long periods during the day. And there have been numerous epidemiological studies indicating that, independent of moderate to vigorous physical activity, that high levels of sedentary time is associated with an increased risk of mortality, obesity, Type 2 diabetes, metabolic syndrome, and different forms of cancer as well. So, therefore, the goal then is to both meet the physical activity guideline and limit sitting that occurs throughout the day. So, similar to how we had the FITT principle for increasing fitness, there's this SITT principle for reducing sedentary time, where "S" stands for sedentary behavior frequency or the number of bouts at a certain duration. So, to decrease the frequency of sedentary time, it's important to think about: how can you plan active time when you're usually sedentary? So for example, maybe if you know that you're sedentary watching TV, maybe you can walk

or walk in place while watching TV. The “I” stands for interruptions or taking breaks in sedentary time, and there’s actually some more and more research coming that breaks in sedentary time may actually be just as important as the total duration of sedentary time. So, just examples of how you can interrupt sedentary time would be to get up and do maybe strengthening exercises during TV commercials, or for many people who sit at a desk all day, just setting a reminder on the phone or the computer to get up and move every 30 to 60 minutes. The first “T” stands for duration of sitting, so just setting time limits on the sedentary behavior. So, maybe if you know you use the Internet a lot in the evening, maybe only limiting your Internet usage to a half-hour. And then, the last “T” stands for the mode of sedentary behavior, and when working with patients it’s good to kind of talk with them and try to figure out: what types of sedentary behaviors do they engage the most in? If it’s driving the car, sitting at their desk, watching TV—and then thinking of examples of how they can reduce that. So, maybe standing up at their desk at work or walking when they’re on the phone. So, these are just all examples of how to reduce sedentary time. So, the second statement that I wanted to talk about today that I often hear as well is that exercise is key for weight loss, and the reality of this is actually that it’s fiction or it’s false, and the reason being is that we don’t burn many calories through exercise and that most individuals tend to overestimate how many calories they burn and underestimate how many calories that they eat. And just to help put that into perspective a little bit, I put this table together here, looking at how many calories that a 200-pound person would burn in 30 minutes based upon the intensity of the activity. So, you can see the intensities range from sedentary, light, moderate, and vigorous. And you can see—let’s take, for example in red, if we look at walking at 3 miles an hour—which is moderate intensity—a 200-pound person in 30 minutes would only burn 158 calories. So, to translate that, if we think about 30 minutes of brisk walking—and again, that’s going to vary depending upon the body weight of the person, but let’s say somewhere between 120-160 calories—you can see here that it’s very easy to kind of undo, you want to say, the hard work of this physical activity by one simple food choice. So for example, choosing a donut, which is 300 calories, would be twice the amount of calories burned than 30 minutes of walking, and I think that’s actually something important to discuss with patients because many people believe that when they begin

to start exercising that the pounds will just automatically drop off of them. So, I just wanted to just show you some data to support this. So, these are some older data, but numerous studies have shown this over the years. So, this was a 6-month trial where participants were randomized to either diet, exercise, or diet plus exercise. So, we can see the red line are participants who were given an exercise prescription and set to do the amount of exercise on their own, and we can see that over 6 months these individuals lost about 2 to 3 kilograms, or 4 to 6 pounds from the exercise alone, which is much less than the diet. The diet is the line in gray, and we see that diet only produced a weight loss of about 8 kilograms over this time point. However, the combination of diet plus exercise—so the addition of exercise with the diet—produced an extra 2 to 3 kilogram weight loss, which is the best. However, you can see that diet is actually the driving factor in weight loss and not physical activity. However, it appears to be a slightly different story when we talk about the role of exercise in weight loss maintenance, and several studies have shown that one of the primary predictors of weight loss maintenance is high levels of exercise, and one of the first studies to show this is one displayed here. So, this was an 18-month behavioral weight loss study where individuals received a diet and exercise prescription, and then after the study was over, participants in secondary analyses were stratified based upon their level of physical activity, so either less than 150 minutes per week grading up to greater than 200 minutes per week. And we see that those who were engaging in the least amount of physical activity, or the top line, lost the least amount in 6 months but also gained the most between 6 and 18 months. However, if we look at the bottom line, or those individuals engaging in 200 minutes per week, what we see is that they lost the most. But what's remarkable here is that they actually maintained that level of weight loss between 6 and 18 months, and that's atypical in terms of—we'll usually see it in more of a checkmark pattern. So, how much physical activity were these individuals engaging in? We can see that those in the high exercise group were engaging in over 280 minutes per week, so high levels of physical activity might be needed for weight maintenance. So, just to quickly summarize the exercise and weight control literature, adding exercise to a weight loss program typically results in an additional 4- to 6-pound weight loss over 6 months. However, just as the guidelines state, greater weight losses can be achieved if more exercise is performed—so, if

you do more than what's recommended. One thing that's interesting here is that exercise may help to decrease the loss of muscle mass that typically occurs with weight loss. So, we know that with weight loss, the amount—usually for every pound lost—about 25 to 30 percent of that is muscle mass, so if you're exercising it helps to attenuate that decrease in muscle mass so that the individual loses greater fat mass. Another reason to exercise while trying to lose weight is that regular exercise produces improvements in fitness, so as an individual becomes more fit, they can exercise at higher intensities and thereby burn more calories at those higher intensities and contribute to weight loss. And then, I should just note here that the amount of exercise recommended for weight loss maintenance is greater than the amount of exercise recommended within the National Physical Activity Guidelines. So, according to the American College of Sports Medicine, over 250 minutes per week of moderate to vigorous activity is needed for weight loss maintenance. And in the last statement that I wanted to talk about today, which again I often hear, is that many people believe that they need to lose weight before they begin to exercise, and they think that it's hard to exercise before they lose the weight. And again, I think that this is actually not true. And just to show you some data supporting that, these are some data from a colleague of mine, Dale Bond, and he did a really neat study looking at pre-bariatric surgery candidates. So, these are all individuals who were electing to undergo bariatric surgery, so they were all severely obese and had a mean BMI of 45, and they were randomized either a 6-week physical activity intervention or a control condition. And the PAI stands for the physical activity intervention, and you can see that over 6 weeks these individuals went from 5 minutes per day of objectively assessed moderate to vigorous physical activity to over 20 minutes per day, so a significant increase where there was no increase in the control condition. And one of the things to note here is that these increases in physical activity that were observed before surgery were actually maintained post-surgery. And then, despite—here are some other supporting data for the statement that an individual does not have to lose weight before increasing physical activity, and this is actually one of my favorite slides to show. So, these are data from the aerobics at our longitudinal study which had over 25,000 men who all received this fitness test and were followed over time to see if they developed cardiovascular disease. So, these men were then classified based upon their

BMI and their fitness level. And you can see here, compared to those who are normal weight with high fitness, as indicated by the red arrow, those who were normal weight with low fitness were three times at a greater risk of developing cardiovascular disease, and you see a similar trend within the overweight and obese categories. However, one interesting comparison to make is when we compare obese individuals with high fitness, we see that they actually have a lower risk of developing cardiovascular disease compared to normal weight individuals with low fitness. So, these data just show us that physical activity has protective health benefits despite an individual's body weight. And I just wanted to kind of show you a similar type of analysis related to diabetes, and we see less robust findings here when we look at the relative risk of developing Type 2 diabetes. The only difference here is that fitness wasn't assessed, so physical activity participants were stratified by physical activity, rather than fitness, and that we see within normal weight, overweight, and obese categories that individuals with low fitness were at an increased risk for developing—or, sorry, low physical activity were at an increased risk of developing Type 2 diabetes, compared to those with high physical activity. And obviously, those who were overweight or obese were at a greater risk than those of normal weight, but again showing us that physical activity has some protective benefits, so therefore we don't need to wait until patients lose weight to encourage them to begin exercising. And then, I just wanted to transition now and just spend the last few minutes talking about some common exercise barriers and strategies to overcome these barriers. One of the things that I've done here is I've included a link to the CDC website, which offers a quiz to help patients identify what it is that's getting in the way of them exercising regularly. So, patients can log on, take this quiz—I think there's eight or nine different barriers to exercise—and I think it's helpful to know when working with patients: what is getting in the way in order to try to think of strategies to overcome those barriers? So, before beginning this discussion about several exercise barriers and strategies to overcome these barriers, I just wanted to quickly highlight an interesting paradox. So, on one hand we know that physical activity has numerous physiological and psychological health benefits, which we see listed here, and research suggests that most individuals are well aware of these benefits, so it's not that people don't know that these benefits exist with physical activity. However, when we look at the

proportion of the population that meets the national Physical Activity Guidelines we see here that if we combine the red and blue segments only 43 percent of our population meets or exceeds these guidelines. However, I should note that these data are based upon self-report physical activity data, and there's numbers probably much lower if it were assessed using objective physical activity monitors. So, this leads to the question, that is: if most people know that exercise is good for them, why don't they do it? And I think the reason is that many barriers get in the way, and research suggests that the number one barrier to physical activity is a lack of time. And in our programs, when we talk about exercise barriers, we often have a conversation with our participants whether it's truly a lack of time or just not a top priority. So, obviously, there are days in everyone's life that there really is no time to exercise. But for most of us, if we really thought about it, if exercise were important enough to us we would find time to do it, and when having this talk with patients, most finally do realize that they do have the time and that they're just not making it a priority. So, other strategies, then, to kind of overcome this barrier of time that often works for many individuals is to plan, and we always like to say to put in when you're going to exercise, put it in your calendar, and pretend that your exercise session with yourself is like an appointment with your boss that you refuse to miss, because we all know we wouldn't miss an appointment with our boss, so why would we miss our exercise session? Also, oftentimes people think to themselves that if they're unable to get in the recommended amount of exercise, why exercise at all? So, it's that all-or-nothing thinking that gets in the way. And as we talked about previously, the greatest health benefits are actually achieved among those who go from doing no physical activity to some physical activity, so I think that this is actually an important conversation to have with patients as well, is that some is better than none. And then finally, when time is a barrier, it's important to make exercise time efficient or get the greatest bang for your buck, so two ways to do that are first, split exercise into multiple short bouts. So, for individuals who have a really hard time finding a 30- or 40-minute segment of time throughout the day, well maybe they can do 10 minutes in the morning before work, 10 minutes at lunch, and 20 minutes after they get home in the evening. And another thing I want to mention here is that interval or vigorous intensity exercise is a good alternative for those who are short on time, so as we discussed previously, it's

doing vigorous exercise. You only have to do 75 minutes versus 150 minutes per week of moderate intensity activity, so you only have to do half the amount of activity if doing vigorous compared to moderate. The second greatest barrier to exercise is a lack of motivation, and research suggests that we can tend to get people started with exercising, but it's more and more difficult to help them transition beyond that period of initial motivation and to make exercise a sustained behavior or habit. And for most people, exercising for the health benefits is too far off or too abstract, so helping people connect with why exercise is important to them we found to be a very useful strategy when motivation is lacking—so asking an individual to identify what exercise will enable them to do that's important to them. So, for some that may be having the energy to play with their grandchildren or being able to walk up the stairs or do housework without getting out of breath, but helping them connect exercise with their values can help improve motivation. Unhealthful thoughts can also get in the way of exercising. For example, many people have thoughts like, "I'm too tired," or "One day off won't kill me," or "Why should I keep exercising if I'm not seeing any benefits?" And there's actually two approaches to help patients combat these unhealthful thoughts. So, one comes from the field of traditional cognitive behavioral therapy and the other comes from the acceptance commitment therapy realm, but both require participants consciously recognizing these unhealthful thoughts. So, the first strategy is to encourage patients to change these negative thoughts into positive thoughts. So, for example, if you're having the thought of, "I'm too tired to exercise," changing that to "I will feel so much better when I'm done exercising." And then, the second strategy involves identifying these thoughts, recognizing that they're just thoughts, and realizing that they don't need to be acted on even if they're—even though you're having the thought, you still, in that moment, have the ability to make a choice and hopefully you can direct patients to make a choice that's consistent with what it is they identify that they value. So, incentives are also a useful way to assist with motivation, and research from the behavioral economics field suggests that if you can help individuals stay engaged with exercise long enough that it will eventually become a habit. So, using behavioral contracts or monetary incentives early on to promote exercise adoption can be a very useful strategy, and there's actually this really neat website called stickk.com, I think it is, which allows individuals to set

goals and sign commitment contracts and even put money on the line to help them achieve their goals. And research also suggests that if an individual doesn't enjoy exercise that they're less likely to do it, so therefore one strategy is to encourage patients to try something new. Even if they don't think that they'll like it, oftentimes people surprise themselves. And then finally, many people find that having some sort of accountability is really helpful when their motivation is lacking. So, maybe this is someone's exercise list or someone to hold them accountable to their exercise goals, or maybe it's the accountability, for example, of signing up for a race. I've had many people who have signed up for a 5K and done the Couch to 5K program and really enjoyed it. Or even increasing accountability through team or personal challenges with fitness trackers have been helpful. So, in addition to a lack of time and a lack of motivation, there are certainly many other barriers to physical activity engagement, and some of them are listed here. However, for the majority of these I think—I always like to tell people, the best thing to do is to plan and then have a contingency plan. So, what will you do if the weather is bad? What will you do if you come home from work and you're tired? What will you do if somebody asks you to go out after work? I also think it's important to note, too, that in order to meet the recommended physical activity guidelines people don't need fancy equipment or a gym membership. Many people enjoy exercising outdoors. For those who are more self-conscious and would prefer exercising indoors, there are many free exercise videos available on the Internet or DVDs that can be borrowed from the library, so just kind of encouraging that as well. And then finally, I wanted to just leave everyone today with some final behavior change principles that have been consistently applied across a variety of disciplines that can also be used when changing physical activity behavior. So, the first is goal-setting, and in our programs we always use goal-setting, and one of the keys here is that we rely on the S.M.A.R.T. principle, and many of you have probably heard of this where S.M.A.R.T. stands for "Specific, Measureable, Attainable, Realistic/Reward-Driven, and Time-Sensitive." So, for example, instead of setting a vague goal like, "I will exercise more," we have found that it's more helpful when participants set a very specific goal such as, "I will walk for 30 minutes on Monday through Friday of next week on my lunch hour." And you can even add, "If I achieve this goal, I will reward myself with something like an iTunes gift card," or

something like that. And we know from previous research also that a lack of self-efficacy hinders exercise engagement. So, exercise self-efficacy is generally defined as a belief in oneself—that they can exercise even if they experience behaviors—sorry, even if they experience barriers. So, a way to increase self-efficacy is to have repeated success over time, so for example, if a patient doesn't believe that they can walk a mile, having them try to walk a mile and gain that mastery experience. And also, positive verbal feedback from others has been shown to improve self-efficacy. Self-monitoring is also helpful for assisting individuals with achieving their goals. So, in the case of exercise this could be writing down their steps from the pedometer or using a fitness tracker, looking at their steps, or MVP minutes from something like the Fitbit. And then finally, there's this concept of stimulus control, which refers to changing the environment around us, since our behavior is often triggered by the presence or absence of other stimuli. So, for example, in order to increase physical activity, you can tell your patients for many times, putting their sneakers by the door to encourage them to get out and walk, or clearing off the treadmill and moving it from the basement as a trigger to use it more often, or putting Post-its on the refrigerator to remind them to exercise. So, hopefully these are a few other behavior change strategies that can be applied to patients who are struggling to find motivation. And that is all I have, so I am going to turn it back over to Leslie, who will tell you about some of NIDDK's resources that may be helpful to you and your patients.

MS. CURTIS: So, thank you very much, Dr. Unick, and as Dr. Unick said, I will briefly mention some Web-based content from NIDDK and some other sources that may help you help your patients manage and adjust to the many myths and misconceptions about physical activity and weight management, because, as we've learned from Dr. Unick, providing patients with health information and tools backed by research—solid research—is critical. Not only is it critical, but if it's backed by research you can also hopefully be able to use it because it's a reliable source, and NIDDK and other government health organizations do, in fact, try to provide free Web-based content and tools which your patients can use to support their physical activity goals. So, I will highlight just some examples of NIDDK content about physical activity that may help your patients. So, as many of you know, when developing a physical

activity plan, taking the first step can feel like an amazing, major, big challenge for patients. But in addition to having conversations with health care providers, resources that you may provide your patients can help them identify their goals and also strategize to overcome their barriers, as Dr. Unick mentioned, and get going. So, NIDDK provides just some resources that I have here that we hope will help people get started. The first is a walking brochure. This brochure lays out a walking program that people can use to help them get started and also to maintain their walking program, and it also provides some sample instruction for folks. In addition to the walking brochure, we also have what's called "Tips to Help You Get Active." It provides people just general ways in which they can set physical activity goals so that hopefully they will be able to achieve their goals. It identifies and discusses roadblocks, another thing that Dr. Unick also mentioned. Dr. Unick provided some great tips for overcoming barriers earlier, and NIDDK also has some additional resources which we hope and we think may help patients overcome their barriers, including conditions such as diabetes, which I mentioned NIDDK conducts a great deal of research in, as well as obesity. So, we have some content that actually combines these efforts. The diabetes diet, using the physical activity document—it actually presents a meal plan for people, particularly for folks with diabetes. In addition—in particular, it's physical activity for people with diabetes because doing physical activity for patients with diabetes—the requirements are a bit different for folks who aren't—have not yet been diagnosed with diabetes and do physical activity just for general health. We also have a document and content called "Staying Active at Any Size." This is a pretty impressive document, because it encourages everyone to be physically active. As Dr. Unick said, some people think that they somehow need to lose weight in order to become physically active. This document encourages people to not think about that. It provides tips for people of all sizes to become more physically active. And so, in addition to the resources that we have to help folks get started and to hopefully help folks overcome barriers, we also have documents and information that we hope folks will be able to use to build a community-based program. NIDDK's *Sisters Together: Move More, Eat Better* program and guide is just that kind of program. It was designed to help African American women and their families do as the title says: get more physical activity and make better food selections. In addition

to the guide that I mentioned, this program also includes a walking brochure, which I mentioned earlier, content for younger black women, called "Celebrate the Beauty of Youth," content for women who have families, called "Keeping Active and Healthy Eating for the Whole Family," and then content for older adults, called "Stay Fit as You Mature." And so, the previous content I mentioned tends to be print-based. We have PDF versions of them, of course, but the next element that I want to mention to you is a rather unique tool. It's a research-based online tool, and it's designed to help people set goals to reach a healthy weight in a specified timeframe and maintain it. This tool was based on research that was conducted by Dr. Kevin Hall, who is a part of NIH, and his research team, and it provides physical activity and calorie plans based on the intended goals. I mean, the research that Dr. Hall conducted allows for you to make account for changes that are made in metabolism over time, and you can learn more about the Body Weight Planner at the link that appears on this slide. And I just want to mention that, in addition to learning more about the Body Weight Planner itself, there's also a video that will take you step-by-step. And then, one last item that I want to mention before we go to the next slide about the Body Weight Planner, is that in 2015 NIDDK and the USDA partnered to add the Body Weight Planner to its SuperTracker. And so, this slide brings us to other resources, and one of the first ones that I want to mention—that I mentioned previously—is the USDA's SuperTracker. So please, at the end of this webinar, please feel free to go and check out the SuperTracker, because you can go through the Body Weight Planner, add all of the information, help your patient walk through all of his or her goals and physical activity and calorie goals, and then plot it in the SuperTracker. Other resources include the *Physical Activity Guidelines for Americans*, which Dr. Unick has mentioned a great deal and as she also noted is undergoing updating; and the American Heart Association's obesity guidelines, which NHLBI actually helped start these guidelines; and then lastly, the USDA Dietary Guidelines, which most of the content that I mentioned in a previous slide, are based on. And so, I want to encourage you to provide and send in any questions that you may have.

DR. UNICK: So, Leslie, I have a question that got sent to me. So, you want me to answer it?

MS. CURTIS: Absolutely.

DR. UNICK: Alright. So, question one. The question is: what do you think will be changed in the physical activity updates in 2018? I don't know a ton about this, but I know that there's a whole advisory committee which has been reviewing the current body of literature. I think some of the problems of the physical activity literature is that there's a really somewhat lack of some well-controlled studies in this area, and I think there's starting to become a little more funding in the area to answer some important questions, but I do think—I know some of the things that have been discussed or talking about what I mentioned in one of my slides, is adding more to the Guidelines about inactivity and the health risks of being sedentary or sedentary for too long. I believe that might be making it into this 2018 Guidelines. I think that there's also been some talk around instead of—the typical recommendation for exercise intensity is moderate to vigorous intensity or based upon heart rate or RPE, but I think that there's becoming more of an emphasis on helping individuals choose an exercise that feels good to them. So, there's some research to suggest that if exercise feels good to individuals that they'll be more likely to do it, and I think some of that may make it into this new set of Guidelines. But we really do—I mean, we do know—I showed you that one chart where something is better than nothing and that 150 minutes of moderate to vigorous physical activity is recommended. However, most of that is based upon self-reported measures, so we're starting to get—there's starting to be more and more studies with objective physical activity monitors, which will hopefully provide us with more data as well. And we still really do not know—even though the guidelines say, for example, 75 minutes of vigorous intensity physical activity is equivalent to 150 minutes of moderate intensity physical activity, we still really don't know that for sure, and we really do need a good trial in that area. So, "Do you have any recommendations and resources for quick group activities at a very sedentary workplace?" So that is a good question. I don't think off the top of my head I have any good resources for that, but I think at the workplace there's more and more studies being done—and this is not necessarily very feasible to do—but, like standing desks or cycling [indiscernible] under people's desks. But there's some people doing some interesting research, which I think is something that could definitely be done in the workplace in terms of determining different time schedules to prompt people for periods of inactivity. So, if you know that you've been

inactive for 30 minutes or 60 minutes, well, encouraging—just setting a little reminder or an email blast or something like that to kind of get up and move. That's certainly worked. I know some offices have used walking meetings instead of sitting or kind of standing while walking, but I would have to—I don't know—I don't know if, Leslie, you know if NIDDK has any resources off the top of your head for quick group activities at a sedentary workplace. I'm assuming…

MS. CURTIS: Some of the ones that you mentioned, but not more than the ones that you just mentioned.

DR. UNICK: Okay. "Do you have any favorite exercise videos for people who are just beginning an exercise program? What strengthening activities do you suggest for patients who haven't been doing any?" We've had—so, a lot of my work has been with individuals—overweight and obese individuals—looking to lose weight, and a lot of them have really enjoyed—there's a series of—they're a little older but videos by—they're called *Walk at Home* videos by Leslie Sansone, and people have really enjoyed them because you can do—like she has, for example, a 1-minute walk video, a 1-mile walk video, 2-mile walk video, but you kind of do it all in place, and people have enjoyed those. In terms of doing other examples of things that people have enjoyed doing are—I mentioned the Couch to 5K program. So, that's actually a very—so, for somebody who's very inactive, who hasn't really been doing any physical activity and getting them to a point where they can do a 5K, whether it's walking or running, and it gives you a detailed—I think it's three or four times a week and it gives you exactly what to do throughout the week leading up to, I don't know if it's 8 or 10 weeks or something like that. So, we've seen lots of people with success like that. And in terms of strengthening exercises, I mean, I think with strength training, the best things to do are things where you move your body weight, but I think the thing with that is just making sure that they're done correctly for safety reasons, as well. So, if people have access to a gym, kind of giving them 8 to 10 exercises where they can do maybe 10 to 12 reps of those exercises. Whole-body exercises tend to work best, but even things that people can do at home, for somebody's who's very inactive—getting up and down out of the chair or just using cans of soup or water bottles to do types of strengthening exercises could be helpful as well. So, hopefully that answered your question.

MS. CURTIS: And this is Leslie. Just to add to that, some NIH resources for older adults, you may want to look into NIA's Go4Life program. In addition to that, NIDDK also has some videos that were developed for patients who have diabetes. So again, you can either go on www.niddk.nih.gov or www.nih.gov and check out those videos and that information.

DR. UNICK: Perfect. So, I have another question here. It says, "Do you have any resources or recommendations for people with chronic injuries—for example, arthritic knees—to help them get started moving safely?" I think there's a really great website. It's called NCHPAD, so I think it's the National Center for Disabilities and Physical Activity or something like that. I think it's NCHPAD? And it's an awesome website that kind of gives different types of exercises and safety concerns for people who are—who have different types of disabilities or chronic conditions that they're worried about. So, I think that would probably be a really good resource. Yes, it's NCHPAD. I just Googled it. NCHPAD.org.

MS. CURTIS: And this is Leslie again. In terms of NIH resources that you may want to consider for patients who have arthritis, you can go on www.nih.gov, but you want to look up the [National Institute of Arthritis and Musculoskeletal and Skin Diseases] and they will have some content for patients who are dealing with arthritis.

DR. UNICK: So, I have another question here, and it asks, "Are activity monitors encouraging sustainable improvement in physical activity levels in inactive individuals?" And there's actually been a good number of studies in recent years that have come out with, obviously, the activity monitors. The fitness trackers have become the craze, and I think the studies are certainly mixed. Some studies suggest that individuals experience significant improvements in physical activity or steps per day, while other studies see no effect. I think one of the things to point out here is that there's obviously some individual variability, and there haven't been a ton of studies looking at long-term sustainability, as the question asked. But I do think even just getting people—even if the trackers get people active, maybe other strategies can be used to help sustain the physical activity long-term. In terms of the fitness trackers for weight loss, it doesn't appear that they have a great effect on weight loss, possibly due to what we said before in that the role of physical activity in initial weight loss is probably pretty small. However, again,

those studies in that area are certainly mixed as well. So, some studies have seen an effect of these physical activity trackers on weight loss, others have not, and some of the better-designed or more well-controlled studies actually have not seen a huge effect of these trackers. But again, there's so much—I mean, one of the things with research is that we tend to just report group means, and I think there's so much individual variability. So, I think certainly if it doesn't work for somebody, it could work for somebody else, so I think it's certainly something to consider when working with different patients.

MS. CURTIS: Okay. Well, we want to thank Dr. Unick, and we want to thank all the attendees for joining this webinar and also for sending us your great questions. And if you have any questions on health information from NIDDK, please call 1-800-860-8747, or you can certainly email us at healthinformation@niddk.nih.gov. And with that, again, we want to say thank you and enjoy the rest of your afternoon.