When to Say When: Treatment Parameters for Home Health Therapy for People with Cardiovascular or Pulmonary Pathologies

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- [Calista] Well, it is my pleasure to welcome back to PhysicalTherapy.com Dr. Pamela Bartlo. Pam received her Bachelor of Science in physical therapy from Daemen College, and then her Doctorate of Physical Therapy from D'Youville College. Pam has been a board-certified specialist in cardiovascular and pulmonary PT since 2005. And her clinical experience focuses on cardiovascular and pulmonary care, but has also included experience in the rehab of adults with neurological system impairments. Since 2004, Pam has been a full-time faculty member at D'Youville College in Buffalo, New York, with primary teaching responsibilities in cardiovascular and pulmonary rehab, research seminar, and clinical fieldwork. Her research has been published in multiple peer-reviewed journals and textbooks. National presentations include presentations at numerous APTA CSM conferences, the American Association of Cardiovascular and Pulmonary Rehabilitation, and the National Conference for the American Alliance for Health, Physical Education, Recreation, and Dance. Pam is also the vice president of the Cardiovascular and Pulmonary Section of the APTA. So we are so pleased to have you here with us again, Pam. And at this time, I'm gonna turn the microphone over to you.

- [Pamela] Okay, thank you. Welcome, everybody. I'm glad to have you joining me on a Friday afternoon. I'm in Buffalo, New York, as Calista said. And it's about 80 degrees and sunny out. So it's always a little tough to sit inside and learn on a wonderful, sunny Friday afternoon. So I appreciate you all being here with me. A couple little things as we start to get going. I do have a tendency to talk fast. I realize this. I do everything I can to slow down, but there are times I just keep going and I don't think about it. So if you have questions, please don't hesitate to ask them in the Question and Answer box. Or if you need me to repeat something 'cause I went too fast, again, don't hesitate to ask me to repeat it or to slow down. And I'll try to remind myself to slow and pause as much as I can. But just once I get rolling, I tend to roll fast. So today we're gonna do

When to Say When. Really, what this is is a lot of people that, excuse me, a lot of people that treat patients in home health are always asking me, "How will I know when I've pushed my patients too much?" Things like that. And so that's where this talk kinda came from, is that help and guidance with, how do you know how much to push your patients, when to back off, and when to stop completely? And so that takes us into the outcomes. So after this course, you should be able to outline the parameters for stable vital sign changes with exercise, identify at least three indications of physiological complications during therapy, develop a plan of care with at least three modified treatments to decrease possible physiological complications in the cardiovascular and pulmonary patient, and recommend at least three interventions learned in the presentation when provided with case studies. So as we get into things, we're gonna start with sort of the basics and go through the resting vitals, and this is when things are good. So here are our resting vitals for adults. Heart rate should be about 60 to 80.

A lot of sources will say 60-100. In home health, I would say, the majority of the time, you're gonna go with about 60 to 100 as you resting vital sign. Because you have a lot of older patients that you're treating, and a lot of our older patients will generally run with a resting heart rate of about 83, 85, maybe 90. And as long as that is their standard resting heart rate and they don't have complications from it, that's fine to use as a normal vital sign. And so that's why I kind of go with that 60 to 100. Systolic blood pressure, 80 to 120, with diastolic blood pressure being 60 to 80. O2 saturation's 97 to 100%. And this is regardless of whether they're on oxygen, supplemental oxygen, or on room air. And we're gonna talk about that more throughout the lecture. But it is important that regardless of whether they're receiving supplemental oxygen or not, we try to keep their oxygen level as high as we can. I did include a child size there. A lot of you in home health, you won't really use this. You're really treating adult to older adult populations. And then early intervention people are really treating more infants. So there's not a lot of child rates you might need. But I gave them to you just in case you

might have kind of that abnormal sort of 12-, 13-year-old that maybe was in a traumatic accident and is now back home. They're not ready to go to outpatient yet, and so you're seeing them in home care. These are sort of the resting vital signs. What I will say with child vital signs, though, is you really have to go based on the child's size and not necessarily the child's age. So if you have a nine-year-old that's a pretty small child, you're gonna go with child size, or child resting vitals. If you have, say, an 11-year-old that's five foot four and 130 pounds, they're built like an adult now, their vital signs are gonna trend more towards an adult. And so it's okay if they were a lower heart rate and a higher blood pressure, because their body size is more typical of an adult. So here's some little variances I wanted to just touch on, though. When we have people with COPD and other pulmonary issues, but really, the majority you're gonna see in home health are people with COPD, a lot of times, as you guys probably already are aware, their oxygen saturations are never up around 97%.

They might be only 88%. You have to go with what's the normal for that person then. We still would like them as high as we can get them, but there are a lot of times, if I have somebody with chronic COPD, maybe not even a stage 4 terminal yet, but maybe they're a stage 3 COPD, even with two liters of oxygen, they might be hovering right around 90 or 91%, possibly even lower than that because they don't wanna put the oxygen on. They're trying to stay off of it as much as they can. Just realize whatever's their rest is what we're gonna have to go with, but we want them as high as we can. Also, any patient that's just had an acute medical issue, whether that's surgery or gallbladder attack, or was in the hospital for acute back pain, whatever it is, they might have slight deviations from those normal values, because the body was under a physiologic stress and might still be recovering from that. And so you have to kinda see, what does their usual look like? Ask them, go with those kinds of things. Here's where I kind of jump on my soapbox here. It is imperative that you check vital signs every new patient. Now the good thing is, I love all my colleagues in home health, because most of the companies you work for now mandate it. You're on an EMR, a

computer documenting system, and most of the time, you can't go to your other screens without filling in vital signs. And I know at times that might seem like a pain to you, but I'm sure most of you if not all of you can attest you've had patients that are very unstable with their vital signs, because they're newly discharged home, and maybe they shouldn't even have been home yet. So I just remind people, it's really, it's important that you check vital signs every new patient. Whether you check them in subsequent treatment sessions or not kind of depends on the patient or your company. I mean, a lot of the home health companies still mandate on the computer screens that they have to be checked every time. But you definitely have to the first time. Because you need to establish what is the baseline for that patient so that if they do have any other complications, you know when to say when, because you knew what their baseline looked like. If you have no idea what their baseline looks like, you might not be sure. What if they normally run a heart rate of 95? You didn't check it. You start exercising with one day, and their heart rate's 102, and they're saying their tired. You might think, oh, my gosh, that went up quite a bit, I should rest them, when it actuality it may not have.

So it's just important to make sure you check those. I also wanna talk here about what I call the fourth vital sign. This is perceived exertion. I'm gonna go over some specific perceived exertion scales on the next slide. And most of these you've probably learned back in school, and you may or may not use them regularly. But even if you don't use a specific scale, you can still use the talk test. You've heard people talk about, when someone's exercising, they should be able to carry on a conversation. Most of the time, when you're really trying to get good exercise out of somebody, they shouldn't be able to carry on an easy conversation. But they should be able to get four, five, six, seven words out without being that short of breath. If someone is talking like this, where they're taking a breath every word or two words, they're definitely exercising at too high of a level. And so you didn't even need to do something specific. You just did the talk test, where you asked them a question, and you can tell based on how they

responded to you that they're being pushed too hard. If you want to use specific scales, which I do recommend a lot because they work great with people, the Borg scale, which is on the far left of the slide, this is that traditional scale. It starts at six and ends at 20. A lot of people don't like it because of that. It's confusing, why does it start at six, end at 20? Well, because it's actually been shown to be correlated to heart rate. So if somebody is around a 10, odds are their heart rate is 60. If somebody is around, or I'm sorry, their heart rate is around 100. If somebody is around 13, their heart rate is around 130. So they're all multiplied by 10. And so that is a great thing to use for many patients. The dyspnea scale in the middle there, this is a great scale just to use to see, how short of breath are they?

Or you can use, also, the Borg Modified Dyspnea Scale there on the right. I do outpatient cardiac and pulmonary rehab now for my primary focus of clinical work, and we actually use the modified Borg scale a lot, because it's a little bit more specific and kind of differentiates a little bit more for the type of exercise we're doing. But I have found with a lot of colleagues I work with that the one in the middle, the zero to four, is more than adequate in home health. Because they're gonna get very short of breath quicker, because their endurance is a little bit more poor than once they come to an outpatient setting. The only other thing I would say with this is, realize it's a subjective scale. People might have difficulty understanding it. If that's the case, just ask, how are you feeling?

Are you feel like you're pushing enough, or too little or too light? Also realize it's subjective in the fact that I've had people that might tell me, on a Borg scale, they're at eight, which is still really light, but I'd look at them, and they're flush, and they're sweating, and they're visibly short of breath. Well, I know that they're just pushing harder than they feel like they're pushing. Or I might, somebody tell me that they're 17, a very hard, and I look at them, and they are not even breathing heavy, haven't broken a sweat, are barely moving. Then I know that, again, it's a subjective scale, and so I

might have to just sort of take that with a grain of salt with occasional patients. But for most people, these will be very helpful. So now, vital sign responses to exercise, this is where we're gonna start to get into the bulk of this course. And as I said, a lot of people that work in home health have kinda asked me, "How do I know when to push people, when not to?" All this kinda thing. And I wish I had the perfect answers to give you today. I wish I could tell you, if their heart rate gets to this, you're doing too much. If their blood pressure does this, you're doing too much. I wish I had perfect, concrete numbers to give you. And sadly, I don't. There are no concrete numbers. That just doesn't exist, because every patient is so different. Every response, every activity is so different. And so what I wanted to accomplish today with you guys is to help you feel more confident. And if you already are a little confident, even very confident, in, what should those vital signs be doing? And then if they're not doing that, how do I decide how to modify my treatment? So that's why we're gonna start right now with, what should they be doing?

So we talked about, here's what they are at rest. These are normal vitals. Now what should they do when the person is moving or exercising? So to start with, the heart rate should rise with exercise. How much, what's safe? It's gonna kinda depend on the patient's status. And we'll talk about this more as we keep going. As you start exercising, you should see a really quick increase in heart rate. Think of this as the fight-or-flight kind of response. Somebody starts chasing you, you have to be able to kick in that heart rate real fast to get away from them. But if you kept running for, say, 20 minutes, if that heart rate kept going up and up and up and up, you'd be in big trouble. So right away, those first few minutes, the heart rate is gonna spike really fast. Then it will continue to increase, but it's gonna increase at a little bit of a lower rate. And then it should start to send a kind of final, level off a little bit. So I'm trying to get my point here, here we go. So you can see this will spike up really high, okay. Then it continues to go up, but at a slightly lower rate. And as we keep pushing out farther and farther, that heart rate will stay up high, but it won't keep raising over and over and

over. Now, with your patients in home health, it really depends. Some of them that are still very unstable and very poor endurance, they're gonna spike really fast. And they might not even tolerate the five, 10, 15 minutes of exercise. They might only tolerate three to five minutes to start with. And you have to kind of just go from there. Somebody that maybe just had a surgery, so their endurance is decreased a little because of pain and being a little bit less mobile, their heart rate is still gonna spike, but you'll be able to push them out to a little bit more of that leveled-off range. The only other thing on the bottom of this is to just be aware of beta blockers. And we will touch on that on another slide a little bit more thoroughly. So how do you decide what heart rate change is okay to start with? What I've kinda done is, I've broken this out to you for people that have acute cardiac issues, versus more chronic cardiac issues.

So if you are seeing somebody that truly has a cardiovascular problem, so not somebody that had, say, a total knee arthroplasty, or a gallbladder removal or something like that, these are people that just came home from the hospital after some kind of a heart surgery, so a CABG, a PCI is that stent or angioplasty, a new heart attack, they were in for a CHF exacerbation, they just had a pacemaker/defibrillator placed, or they have a temporary defibrillator. One example's a LifeVest, and we'll talk about this on the next slide. But basically, anyone that you are seeing that their primary problem you're treating them for in home health is a new cardiac issue or an exacerbated cardiac issue, for those patients, I would start with exercise that gets them about 10 to 20 beats above their resting. So if I'm gonna start doing walking or transfer training or maybe some seated exercise or some standing balance exercises, I probably will only have their heart rate go up about 10 to 20 beats per minute from where they were at rest. If after the first couple of sessions with them, so let's say I'm on session four or five, and they've been stable with all of that, then I'll let them push further than that. So this is really the first one to three sessions. I'll have them only go about 10 to 20 beats above resting just to see how they feel. The other part of that I have there is check maximal stress test results. We use this in outpatient all the time.

You are almost never going to have a stress test in home health, because they probably had some kind of surgery. So even if they had a stress test a couple weeks ago, they've had surgery since, and that stress test really isn't all that valid anymore. So most of the time, you're gonna have to just go off of their testing. If for some strange reason they had a stress test after their surgery or exacerbation, then you can use that, and you wanna go with the method to determine that based on what you've learned in college. It's called the Karvonen's method. I'm not gonna touch on that a lot today, because you most likely won't get to use that. So I wanna just touch on this temporary defibrillator. LifeVest is a brand name. It just happens to be the brand that's the most common one out there, which is why I kind of put it on there. So a lot of times, you'll see people even call it LifeVest, even though they might have a different brand. But what this is, it's a temporary defibrillator. And the reason I wanted to touch on it here is we're starting to see these more and more often. And so I've had a lot of PTs and OTs and PTAs in home health coming to me and saying, "Oh, my gosh, "what do I do if they're wearing this LifeVest?"

So here's what it is, it's really a vest. I mean, it's a clothing type of looking vest that they wear underneath their clothes. And there are electronic sensors that actually are against their skin. And these sensors will detect arrhythmias, so it's almost like we have them hooked up to EKG, but you're not getting a readout, the machine is. Usually it's VT that it's looking for, but if it's any sort of a life-threatening arrhythmia, the vest will then deliver the shock just like if you had paddles on the person's chest or if you had, say, an AED, an automatic external defibrillator. It's gonna work just like that. The sensors will pick up this arrhythmia and create the shock through the skin for the person. Usually when people are getting these, it's because they're not sure if the person's gonna need a permanent defibrillator or not. So they've had a new MI or a new surgery. They were showing arrhythmias in the hospital. But they're not sure if they're gonna just clear up with medications and time. And so they don't wanna put a

defibrillator in right away. They'll use this LifeVest or other temporary defibrillator. Patients I've had up to about six months on it. So it's not something that is gonna be gone in a couple weeks, although it can be. It just depends on the patient. Typically, for our PT sessions, it's not really gonna affect us at all. So you can treat the person normal. You can take heart rates, blood pressures. The only time is if it fires. And the patient's gonna tell you if it fires. They will feel it. If it fires, then you are gonna wanna stop. Your protocol for your facility or your company will tell you whether you can continue that day or not. Typically, we won't unless we call the doctor just because they're still a little more unstable. If somebody has a permanent defibrillator and it fires, you can still keep treating. But a lot of times, when they have this external one, they're a little bit more unstable.

So we wanna just get it checked to see, did it fire for a real arrhythmia, or did they not have one? Joyce asked a question, "What methods do you use "to monitor heart rate and how frequently when exercising?" Those are two good questions. Whatever you feel comfortable with to monitor heart rate. I personally will always take a manual pulse the very first time, and I do recommend that. Whether you take it radially, so out at the wrist, or carotid, up on the neck, just depends on you and what you're comfortable with and what you can feel on that patient. Sometimes a radial one's difficult because of their circulation.

So you might have to do a carotid, and so I usually do, and I always recommend 10-second heart rates. Unless you're specifically looking for an arrhythmia, you don't want a one-minute heart rate, or even a 30-second heart rate. 10 seconds works the best, especially because then you can use that same thing when exercising. 'Cause if you stop exercising to take a heart rate, it's gonna start coming down. And so you get a much more inaccurate heart rate if you're taking a 15- or a 30-second or one-minute heart rate. So I suggest 10-second heart rates at either the radial or the carotid artery to start with manually. If you find that it's a nice, regular pulse, and you'd have a pulse

ox with you, and you put the pulse ox on and it matches it, then that is absolutely fine to check a heart rate with pulse oxes from then on. I have no problem with you putting a pulse ox on to get heart rates, and you can check them throughout. That way it's a little easier. So the second part of your question was, how frequently when exercising? It depends on the patient. We're still right here, kind of talking about that acute cardiac patient. I would check them probably at least once if not twice during exercise, and then another recovery. So I would do a rest, some sort of activity, exercising, ambulation, whatever I was doing. They need to kind of check their breath a minute. I'm gonna check it. I'm gonna do some more activity. as they're catching their breath, I'll check it again.

And then at the end of my session, I'll check it as a recovery. In a minute, we're gonna talk about people with more chronic or secondary cardiac problems. I wouldn't check theirs as frequently, maybe once during your whole session, or if they look real stressed physically, because they're just not as unstable. So we'll kind of touch on that as we go through. But there's no right or wrong answer. You can never do too much, but you could always do too little. So definitely err on the side of more if you want to. The other thing I wanted to touch on here is LVADs, left ventricular assist device. I know my little graphic drawing there is pretty crude. I couldn't get any of the companies to let me put 'em up here because of copyright issues to put a picture on here. But I'm gonna kind of talk you through what this looks like. So obviously, here is the heart. This box around here is the patient's chest cavity. So inside the chest is a motor. And this motor has one tube connected to the left ventricle and one tube connected up to the aorta, okay. This tube comes outside the body. This is a pack or a kind of computer system. I don't wanna say a motor, 'cause the motor's inside. This is sort of the computer system, the programmer, outside of the body. And it's hooked up to two battery packs. These are the battery packs. Okay, so what happens is this is usually used either when somebody is going to need a heart transplant, and this will kind of buy them time and kind of give them a bridge to heart transplant. Or I have had other patients, where this is going to

be used instead. They are either not a candidate for a transplant, they've decided not to get one, something along that line. So it could either be a temporary thing or a permeant thing. But people are seeing these a little bit more in home health. It kind of depends on where you're located. If you are near a major hospital that does transplants, you'll probably see this a little bit more frequently than somebody that's not. But so what happens again is this motor inside the chest will take the blood from the left ventricle and pump it up to the aorta. The heart is still doing it itself, too, but it's just not strong enough, so this makes sure it's strong enough, okay. And then out here, this programmer, that's where they're gonna set up all their different sort of parameters, how much should the pump be flowing, those kinds of things, too.

Okay. Some precautions is you really don't have to treat them any differently, except that you just wanna make sure that the line that's coming out of their chest isn't really getting pulled on at all. It is sutured in there, it should be fine. You keep a general eye on the wound around it to make sure you don't have any infection or abnormal drainage around there. But the wound will clear right up. It'll scab up and dry up, and it should be just fine. The other big thing is the patients always have to have spare battery packs charged. I've never really has an issue, but you gotta make sure that they're charged. Because if the batteries or the motor fail, there's really nothing you're gonna be able to do. I mean, you're gonna call 911, get 'em to an emergency room, but there's not a lot you can do.

While you're exercising, you're gonna wanna kind of just make sure that the tube is in a relaxed position, too, the one coming out of the body. The only other thing I will tell you here is that their blood pressure isn't a normal blood pressure. So you can still take it if you happen to a Doppler ultrasound machine to take, like one you would use for ankle brachial index. If you have that to take a blood pressure, it's a little easier. If you still just have a blood pressure cuff and stethoscope, that's fine. You're just only gonna hear a systolic pressure. So you'll pump the cuff up. And as you start letting the blood

out, or sorry, letting the air pressure out, once you hear that blood flowing again, that's the only pressure you're gonna hear. You're never gonna have a diastole, because the pump is always pumping the blood. So you're always gonna just have a systolic blood pressure. And typically, here, the doctors that put this in, the heart specialist will probably want about in somewhere between 75- to 95-millimeter mercury pressure. Each of your patients will have a prescription. So I can't give you the exact, because they kind of vary a little bit. I've had people that, the doctors will let 'em go upwards of about 100 or 110 for their systolic pressure. But they're definitely a lower pressure, because it's a constant systolic. There isn't a systolic versus diastolic. Sherry had written in when we were talking about heart rate. She also does an apical rate periodically. And you can do that as well, whatever is comfortable for you to take that heart rate.

So now we're gonna kinda shift to a more of a chronic cardiac patient, or where this is their secondary pathology. So chronic CHF that they weren't new exacerbation, just chronic, stable hypertension, somebody that has a cardiomyopathy that hasn't had an exacerbation, somebody with an old MI, a pacemaker/defibrillator that aren't new, so basically somebody that you're seeing for other problems but has this cardiac history. Or you're seeing 'em maybe for their cardiac stuff, but it's not an exacerbation. So these are your, again, people with abdominal sorts of surgeries, or orthopedic surgeries or something along those lines. They just happen to have a cardiac history. In those cases, that resting heart rate versus exercising heart rate, I would let them go up about 20 to 30 beats per minute above resting. So you start doing your exercises. Let's say you're doing range of motion stuff, 'cause they had a hip replacement. And then you're doing some balancing, a limb stance, and some ambulation and all those. I probably would only check them once during the session, the first few times I see 'em. And if they're right around that 20 to 30 beats above resting, and they're responding fine, then that's great. Just as with the acute issue, once you're four, five, six sessions in, if they've but responding well, and they're progressing those heart rates higher without

any symptoms or any complications, then you can go higher than that. This 20 to 30 beats above resting is sort of that guideline for the first couple of sessions so that you know you're in a good, safe range still. For the healthy adult, you've probably all learned in college that 220 minus age, and then that's the maximum heart rate, and you give a percentage of that. It's really not accurate at all for older people or people with cardiovascular or pulmonary problems. So we really don't recommend it at all for those types of patients. I would say, really, you should be going more towards endurance testing if you have that. But we're not necessarily discussing the healthy adult here anyway. Most focus on the patients you have, even if they don't have a cardiac issue, they're not necessarily perfectly healthy. They've got some other kind of medical issue or acute injury issue that's gonna throw things off. So 220 minus age is not usually the best to use. Exercising blood pressure, systolic blood pressure should increase, and then level off. Diastolic blood pressure might increase, but it really should be very slight, and then sort of remain the same as a possibility as well. O2 sats should definitely remain the same. They might go down a little bit but still be in the safe range that we'll talk about here in a minute.

So those Borgs or that, how are they feeling? These can vary quite a bit in home care. It depends on the patient, what their diagnosis is, how stable or unstable they are now. What was their prior level of stability and endurance? So these can vary a lot. So the general guidelines I'm gonna give you is, if it was a new onset, sort of that acute problem with cardiovascular issues, I would say keep that Borg around a nine to 11. So you're still working just fairly light to maybe just starting to feel like they're pushing a little bit. If they're responding well and their vital signs are responding well, and they're not having any symptoms, you can push 'em a little bit more, but I would still probably stay below the 13, which is where you're starting to get somewhat hard. For any sort of chronic condition where this is their secondary condition, you can probably push a little bit higher on the Borg scale around that 10 to 12 if they've been stable. Just as I said before, you could probably push a little bit more. But I would probably stay below 14.

You don't need to get to the hard range. They can still get a lot of good benefits functionally and cardiovascularly without pushing them to the point where they feel they're working very hard, so that somewhat light range up into the starting to get a little bit towards hard. So can I monitor too much? And this was sort of that question, how often do we monitor? You really can't monitor too much. You definitely can monitor too little. If you're not paying attention and somebody starts getting unstable, then that's an issue. I would just say get comfortable, though, with primary cardiac issues versus secondary cardiac issues. Because you definitely do not need to monitor as much with secondary issues unless the patient's becoming more unstable or having other symptoms. Then you kind of treat them where you monitor them more. The other thing is, you might have to go with what your company dictates. As I said, a lot of home health companies will dictate in your documentation that you have to take vitals at a minimum.

And so you might have to just hit those minimums. Beyond that, you can put in extra if you feel the patient needs it or warrants it. So I would say kind of go with that range of, how much do you feel you need to do or not? So now, here's where we're gonna get into kind of the bulk of, how do we start to make these decisions of, do we modify treatment, do we stop treatment, do we get extra help, those kinds of things. Some of the questions on your take-home test or your post-test for this kind of go off of some of the resting vitals and kind of understanding those. A lot of it is gonna come through the next two sections. Because this is the bulk of what we're really kind of talking about. So heart rate guidelines, I told you what they're kind of supposed to do. How do we determine if they're too high or too low? So really, resting heart rate, if it's resting right away above 120, I recommend holding exercise that day. Your company may even use a different value. And so it just depends on what your company uses. They might go lower than that. But if they do happen to stay higher than that, which rarely do they, I would still it cut it at 120. If their resting heart rate's at 120, they're already in a very, not necessarily unstable, but more unstable situation. And you just don't need to be

pushing them. If, for some reason, you have to do something with them that day, I would just do functional stuff. Like, let's say you got into home care. They're not feeling well. Their heart rate's up a little higher, but they really just need help getting to the bathroom or something like that. I would just do something functional and nothing else. Once they're exercising, heart rate going too high or heart rate dropping, there's no set values for either one. We're gonna start touching on, what do we think? But I would use sort of that 10 to 20 beats about resting, 20 to 30 beats above resting as sort of my guidelines to start with. Heart rate dropping, it really should not ever drop. It might drop a couple of beats, that's fine. But if you're going below, anything more than five beats per minute drop, that's probably not stable. And you'd need to really stop and reassess what's going on with that person, okay. And I had a question, "Is it after they take their medication?" I'm not sure completely what that means. I'm thinking the heart rate changing after their medication. I would say get an idea of when they take their medication regularly.

Most people will take their cardiac meds either just in the morning or morning and night. There are some people that only take them at night, but a lot of times it's just in the morning or morning and night. And depending on when you're seeing them during the day, that's how you can kind of decide when you're going. And so I would just kind of take that into account. If their blood pressures are really high, or their heart rate's still kind of up and it should be a little lower, but you ask 'em about their meds, and they just took their meds maybe 20 minutes before you got there, I'm not gonna worry about it quite as much. Because it could just be that the meds aren't all the way on-board yet. Versus, let's say they took their meds at 8:00 a.m. and it's now one in the afternoon, then I'm a little more concerned about the vital sign I'm seeing. So beta blockers, I touched on 'em earlier and said we'd talk about it. You guys all know this, I'm sure. But I did just wanna reiterate this, because it comes into play so much in our therapy sessions. This is whether somebody had a new issue and they're on beta blockers, or even more often, you'll see it that they're just a chronic cardiac person.

You're seeing 'em for some other diagnosis, but beta blockers are one of their medications. The point of beta blockers is to lower the person's resting heart rate. So this is when you see people with 60s, low 70s, maybe even 50s for their resting heart rate. If they're on a beta blocker, that's okay. And just a reminder, beta blockers are the ones that end, almost always, in O-L or L-O-L. So metoprolol, propranolol, atenolol, those are the beta blockers. And so they're meant to lower the person's heart rate. The big thing with exercising, though, is that they'll cause a blunted heart rate response. So if you remember back to that graph I showed, the heart rate'll go up real fast, then it'll keep going up, and then it'll level off a little. You're not really gonna see that with somebody that's on beta blockers. The heart rate will go up, but it'll go up very slow and stay very low the whole time. So for example, let's say they started with a heart rate of 62. You could be exercising them where they really feel like they're pushing themselves. They might say that they're at a Borg that's somewhat hard. You might visibly see them breathing hard.

And yet their heart rate might only be about 70 or 71. That's common with beta blockers. That's sort of what the medication is doing is helping to protect the heart by not letting it get too high. So the thing is, when you have somebody with beta blockers, you don't use heart rate quite as much for exercise prescription or, excuse me, to monitor how they're tolerating their exercise. You can use blood pressure, because that will change with their exercise. But it's even better to use those RPE and talk test scales. So how are you feeling? Do you feel like you're working hard enough? Ask 'em to carry on a conversation with you. Those will give you a better idea of what that heart stress is, since the heart rate won't be as accurate. And so here's sort of a nice little scale that kind of gives an idea. This top one is without a beta blocker. So you can see we go up, we spike, and we keep going up, versus somebody with a beta blocker, they started lower to begin with, and they're never gonna get very high. They're just gonna kind of come nice and low. And so it is okay to still track heart rate. You do wanna know what it's doing. But it's just not gonna be the main vital sign to help you make

your decisions on how they're tolerating exercise. I wanna touch for a minute here on pulse and EKG. So if the patient had a regular pulse at rest, and this is the other reason I check it manually the first time, is because I wanna see, do they have a nice regular pulse, where you're feeling that pump, pump, pump kind of thing beneath your fingers? If they had a regular pulse, and now they exercised, and you happen to take another pulse, or you see that the pulse ox just isn't registering correctly, so you take a pulse, they've got some kind of symptoms, they're short of breath, they're fatigued, maybe they're sweating a little bit more, they're feeling heart palpitations, you check it again. If it's now irregular, that is a very big sign of activity intolerance. And that's something we're gonna need to address immediately, not necessarily calling 911, but it's something that is not normal. They should not go from a regular to an irregular pulse. Okay, so at that point, if that happens, we need to stop exercise, reassess all of their vital signs, all of their symptoms, and then decide where we're gonna go next. And in the next section of the lecture, we'll talk about that a little bit further.

EKG, if you have the ability to look at EKG, it's great to monitor for possible arrhythmias. I know a lot of people in home care don't have this ability, but it is becoming more and more available. And we'll talk about this sort of on the next couple slides. But it's really good to keep an eye on somebody's EKG if you can get a picture of it, 'cause it gives you a nice, true picture of what their heart stability is. Okay, so here's one handheld unit. So this is one that I actually even own. It's called the HeartCheck. Their system is a little bit different that you don't have an app on your phone or anything like that. It actually connects to them through the company. And so once you use this with the patient, you can see an immediate EKG readout. My pointer's not coming down right now. But you can see an immediate readout on the main screen there. If you then hook it up wirelessly to the computer later on, it will upload into, oh, here comes my cursor, beautiful. So this screen right here is where you will see the EKG printout. And then later on when you are back at home or when you have access to your computer, it will upload those EKGs into sort of the cloud. And

then you can either review them more there, or they have a physician on staff that reviews them as well. If you go that route, you do have to pay for that service. But if you review 'em yourself, you don't have to pay for that. The other thing is, there are a bunch of different apps out there now that you have to sort of buy the piece of equipment. So it'll look something similar to this. So where you're going to, and just to kind of show you on here, your fingers are gonna go on those silver parts. The metal piece, your thumb will go on one, and your forefinger'll go on the other. And that's how it reads it. But there are some out there on the market now that they'll actually then read that to an app on your phone. So there's a website in my reference list that kind of went through them. I have not personally used any of those. But they're definitely worth it to check into. They're pretty cheap. Once you buy the initial piece of hardware, you have it.

And then it's just on your phone. I had tried to look to see if there were apps that would just use your phone. And I did find one that said it would. But it didn't read it correctly. It was really just measuring heart rate and not the EKG. So if you have that available, I wanna just touch for a quick second on sort of what you should and shouldn't see. So it's best to know the patient's resting vitals. They might have some arrhythmias. And I've listed some common arrhythmias there that aren't necessarily a problem for us. So a-fib, premature atrial contractions, which are PACs, premature ventricular contractions, the PVCs, multifocal PVCs, a first-degree heart block, or either right or left bundle branch blocks. These are all arrhythmias, but they're common arrhythmias that are usually okay, because the person is being treated with medications. They're stable, they're not impacting the person. So it's important to know if they have those at rest. Because if you didn't, and you just see 'em when they're exercising, you might start to get very nervous and think, oh, my gosh, this person's unstable. But know they might have had those already. What you wanna watch for is the abnormal rhythms or if an existing one gets worse. So let's say we had a-fib, and it starts to get worse. Or we had a primary heart block, and it starts to go to secondary or third degree, or if we start

developing multifocal PVCs when maybe we only had a PVC once in a while originally. Those are sort of existing ones getting worse. VT is the one that we're specifically gonna look for as the most unstable. Because that is two steps away from a full cardiac arrest. And how we respond to these we'll talk about in the next session. Blood pressure changes, if you have systolic blood pressure over 200 or diastolic over 100 at rest, that's when we're gonna hold exercise for the day. We're not even gonna exercise. But that's just at rest. If you're exercising, it just depends on your company and on the patient and your comfort level. Sometimes we might see blood pressure start to go up. And it's okay if they get up around 200, as long as we then rest and they come back down. But if we're starting to see blood pressures going over 250 systolic and over 115 diastolic even during our exercise, we would wanna stop what we're doing and really reassess if we can continue. If blood pressure starts to drop, it's okay if it drops a little bit. Because you might have some patients that, they were sitting down, and now they stood up.

And so they get a little bit of that vaso response to standing. And that's okay. But if, once they're standing and exercising, that blood pressure drops and stays down, or it continues to drop, really, more than about 20 millimeters of mercury, that's something that we really don't wanna see any more, and we would need to reassess. Somebody had typed in, too, Vincent had typed in that he's had some patients that have the EKG app that comes with their iPhone and asks, would I sort of recommend that? You have to kind of play it by ear and sort of see, especially with the patients that are now having the Apple iWatches, and they're specifically for a-fib. That, I would say, if it's looking for a-fib, then I would definitely go ahead and use that. For some of your other ones, it depends. They may be okay, they may not be that accurate. The iWatch was specifically set to pick up a-fib. So it won't really pick up VT or something that's serious. So you kinda have to just look and see what that patient's app is picking up. And then Sherry was asking kind of how soon to recheck. And we're gonna talk about that in the next couple of sections. So we'll go back to that one. Okay, oxygen

saturations. So no great definites that I can give you here. What I would really just say is check with your company, what their protocol is for resting. Some people will say that, if their oxygen saturation is less than 90%, you can't even exercise them unless you can get it over 90. Some will say 88%. Some will say it depends whether they have supplemental oxygen or if they're on room air. So I would check what is your company's policy of what's the minimum oxygen saturation they have in order to exercise. Most of the time, I will use 90% for my patients, 88% if they're a pulmonary patient. But it just depends. I also have the ability to put them on supplemental oxygen, and unless they already have it in their home, you're not gonna have that level. So you might have to go with more than 90%. Because if they're at 88 and you start exercising, and you can't put oxygen on 'em, they're just gonna go lower. So I would say just go with what your company says and with what you have available. If they don't have oxygen in their home, I would probably use 90% as my minimum I want resting.

Once you start exercising them, typically 90 to 92 is as low as we really want people getting. If they start at a slightly lower range, we'll let 'em go as low as 88%. But the studies have shown repeatedly that, as you start getting into any oxygen levels below 92, especially below 90 and 88%, you start to get lack of oxygen at the tissue or a hypoxemia, and that can lead to hypoxia, which is when the cells will start to have injury and death. So that's why it's so important that we try to keep oxygen saturations higher, just because that way we know that the tissues are getting the oxygen delivered the they need. And I realize that this doesn't always work perfectly either. You might have people with poor circulation. You might have difficulty reading the pulse ox through fake nails or something like that. These are sort of those general guidelines that we want to try to use as our ideal. But I do realize that it's not always perfect to go with these. I have had patients that exercise, and the second I stand up and walk them, they drop to 84 or 82, and there's not a lot I can do. In that case, we'll talk about this a little bit later, but we've got some strategies to try to keep them as high as we can. And

here's what I said a minute ago. There's no real specific source. So ACCP, that's the American College of Chest Physicians. AACVPR is the American Association of Cardiovascular and Pulmonary Rehabs. American Thoracic Society is another group. So all these groups have sort of come out and try to, given guidelines with what to do for supplemental oxygen. And the Cardiovascular and Pulmonary Section of the APTA also came out with supplemental oxygen guidelines. But it just depends on the patient. What I would say is use that sort of 90%, and then on the individual, base it, flex that as you need to. If it's a pulmonary patient, you know they're gonna probably start a little lower. But even then, I try not to let them go more than 5% below what their resting value was. If you're seeing this, and let's say you're treating somebody that is not a primary pulmonary issue. Maybe that's their secondary condition. You're treating them for something else in their home. But you're seeing their oxygen levels go down around 89, 88, 86% when you're working with them. It's not wrong to call the doctor and say, we need to get home O2 for this person.

Almost all states, 88% is the cutoff to qualify for home oxygen use or supplemental oxygen. It might be a little different, so you might have to check a little in your state and with your company. But most of the time, 88% is that cutoff. So even though you might be treating somebody for an orthopedic surgery, let's say they have a diagnosis of COPD, and you're treating them, and they're dropping. It's okay to contact that doctor. And you should contact that doctor and say, look, we're seeing oxygen levels drop below 88%. I think this person really should qualify for supplemental oxygen to be used at home. Whether you contact their primary doctor or their pulmonologist is up to you and sort of what you have available. A lot of people will want you to contact their pulmonologist, that's fine. Otherwise, you might go through their primary doctor. Typically, like if it's an orthopedic issue and that's what the doctor referred, you're probably still not gonna contact them. You'll contact the primary or the pulmonologist. These are some other symptoms of activity intolerance I wanted to touch on. So diaphoresis is more than just sweating. And people will get a little bit sweaty, a little bit

more warm temperature. Diaphoresis is that profuse sweating. It tends not to be droplets of sweat. It tends to be more of that puddling off of them, that kind of clammy feeling. So if patients are complaining of that, that's definitely intolerance. Severe shortness of breath, people that just really can't catch their breath. Any chest pain is a sign of intolerance of activity. People should not have chest pain. Now, if they had an incision, let's say they had a bypass surgery and they have an incision, and they complain to you that the chest pain is a pulling sensation inside their chest, that's different. That's not chest pain because of a cardiac issue. That we would allow. But chest pain such as that burning sensation, pressure, I feel like something's stabbing me, that kind of chest pain is always wrong, and we should not have that going on. I wanted to touch on sputum. I don't know anybody, I've ever met anybody that went into PT because they really wanted to assess sputum. I don't think any of us wanna look at something somebody's coughing up. But it's really important that we do. So you're gonna have patients that'll have this little bit of sputum going on related to their surgery, their immobility, whatever.

Take note, though, of whether it's changing. If it's increasing in how much they're coughing up, the amount it is, how frequent it is, any change in color, that's a big issue. And what we're really looking for is any of the greens and yellows. That typically means some kind of an infection, a pneumonia, something like that. Any sort of brassy color, that tends to be more of an abdominal aortic aneurism or something along those lines. And then actual blood-tinged doesn't always mean something that's really emergent. But it could mean that we're having a lot more frequent coughing, and so they're popping little varices within the trachea. Or it could be that there's something more severe going on, that they're having microcontusions inside that windpipe or a trachea area. Couple quick things specific to people with cardiovascular and pulmonary issue. Beta blockers we kind of touched on, but just remember they're not gonna go up as much. If somebody has chronic a-fib, so you might not be treating them for this, you're treating them for something else, but they're somebody that has chronic a-fib, typically

we will try to keep their heart rate less than 110. Because what happens with a-fib is that the atria of the heart is doing lots and lots of little pulsations but not a true atrial contraction to force that blood down in the ventricle. So therefore, when the ventricle tries to pump that blood out, it doesn't have as much volume as it should have. So if we start going in heart rates higher than 110, there's less time for that blood to get down to the ventricle just by passive filling. So the valves are valves are open from the atria at the ventricle, and we do get passive filling. But if the heart rate speeds up, there's less time for that. And so more and more volume is not getting into the ventricle and not getting out to the body. And so that's why when somebody has a-fib, even with exercising, we try to kind of keep their heart rate below 110. So that way we know there's enough volume getting into the bottom part of the heart, so that can then get contracted out to the rest of the body. Pulmonary patients, anybody, asthma, cystic fibrosis, anything like that, but very specifically with COPD and IPF, so our pulmonary fibrosis, the heart rates tend to be higher at rest. So you can definitely use that 20 to 30 beats above resting for the their first few sessions. Just realize theirs is gonna be higher.

So they might start with a heart rate around 105, just because their body is constantly trying to adapt for that lack of oxygen. And so they'll run a higher heart rate. You can also use their RPE and their dyspnea scale to really guide how much you can push them. Any acute infections, I put pneumonia on there, but there's all kinds of respiratory types of infections, or even other systemic body infections, they might also run higher heart rates at rest. So somebody might be running a higher 80s, 90s, even low 100s heart rate. So you can use RPE or the 20 to 30 beats above resting as a guideline for them as well. Blood pressure changes that are kind of unique, some of your cardiac patients might have low blood pressures because of the meds they're on. Watch, though, that the patient drinks enough fluid so they don't bottom out as they vasodilate. So you know, they want 'em running these lower blood pressures to protect the heart. But then you start exercising with the person, those blood vessels vasodilate

to deliver blood to the muscles. You run the risk of their blood pressure dropping too much. So the best thing you can do is just have 'em keep drinking water. Make sure they stay up at least 90s over 50s kind of range so that they don't bottom out too much. If they really are having issues that they're dropping too much with exercise, you can always talk to the doctor. As they get more active, you can ask, can we cut the medications back a little and let their heart rate be a little bit higher? Also, pulmonary patients, along with those high heart rates, they might have higher blood pressures at rest. So you just wanna make sure their blood pressures don't go too high during exercise, just like their heart rate. Oxygen saturations, cardiac patients, not usually a problem. But if they have a pulmonary history too, that's when you're gonna kind of wanna watch the oxygen saturations. We kind of touched on people with the chronic pulmonary diseases already. I wanted to touch a little bit on some of the blood issues.

So somebody that has anemia or somebody that has low hemoglobins, just realize they might run some lower oxygen levels, just because they have less hemoglobin in the blood to carry that oxygen. And so you might have somebody that's having a low O2 sat that day. It could be a sign that they're having a low hemoglobin level or an anemia type of issue. Also, somebody that has higher levels of carbon dioxide. Carbon dioxide binds easier to hemoglobin, so it usually will kick the oxygen off of that. So if you have somebody with obstructive pathologies, usually our COPDs, they're gonna possibly run lower O2 sats also, too, just because that high CO2 level forces the oxygen off the hemoglobin. And so that way they'll run lower O2 sats. Also, people with CHF, so they might get mild to moderate shortness of breath during exertion that you might not see O2 sat changes. So it's important to give people that have COP, or I'm sorry, that have congestive heart failure, to give them frequent rests even if their pulse ox looks fine. Because it's the pulmonary edema issue that's causing them to be short of breath. So they have plenty of oxygen in the blood system, and it's being carried by the hemoglobin. So that's why you're not seeing an O2 sat change. But they're just having less oxygen kind of getting into the blood, and so that's why they're feeling more short

of breath. There's not enough oxygen sort of getting to the tissue. So it's really important with people with CHF, just let them have lots of rests. Exercise, rest, exercise, rest, even if their oxygen saturations aren't changing that much. As I said earlier, any sort of chest pain that's related to angina is not a good thing. That's a sign of intolerance. If the person has stable angina, they are gonna feel their chest pain come on at a certain level, and then it'll subside with rest. So we walk three minutes, and that pain comes on. And as soon as we rest, it goes away. Or they perform a certain intensity level, and it goes away as soon as they rest. That's fine, and what we're gonna do is we're gonna keep exercising that patient, but we're gonna try to keep their exercise just below that level that'll trigger the angina.

So we wanna push right up to that level but not all the way into the angina. If somebody's having unstable angina, that's when the chest pain comes on at any time. They might be sitting there doing nothing and they feel it, or it might be related to activity. But normally, I can walk five minutes. Today I can only walk two minutes. These are people that we're not really gonna exercise. If we're still treating them because we need to be able to see them for other issues, we're just gonna keep it to functional tasks, ADL kinds of tasks, and we're gonna get them back to see their doctor to get that more under control. Because that is something that could become serious quickly. And so we wanna make sure that we're not pushing the person, aerobically or physiologically. We're really just only doing that functional stuff they need in home as we're getting that more medically assessed as well. Some other symptoms that might be unique to people. Bruising, not necessarily unique to cardiovascular, pulmonary people.

But bruising is something to take note of if they're on anticoagulants. And I know you guys have probably seen this a bunch in your practice. You'll see that person with the thinner skin, a lot of bruising. Take note of that. Talk with the patient and their family members more. We need to make sure that they're safe with their balance so that we're

not having issues of them possibly bleeding internally or having hematomas because of falls or bumping into things, as well as, we might wanna talk to the doctor about cutting some of that anticoagulant down. If you see them really bruising a lot, then we might need a little bit less anticoagulant on board, because we are at the risk of them developing some sort of a hematoma that could cause major issues. Hypoglycemia, so these are our people that have diabetes. You wanna just make sure you're watching for the signs of hypoglycemia. What are the most common ones? Sort of that weakness, that jittery feeling, maybe trembling fingers. They might feel hungry. Something very unique to people with diabetes with hypoglycemia is they might feel tingling in their fingertips and lips. A lot of times, we'll get people with tingling in their fingers because of circulatory issues. But if it's related to hypoglycemia, they'll feel it in their lips, too. And it's one of the only things that triggers both the fingertips and the lips. They might feel dizzy, that sort of mental dullness, a little out of it. We've all probably had those days we haven't eaten enough and we just start feelin' kind of a little out of it, a little foggy.

That's the sort of sign we're looking for. The other unique symptom to kind of pay attention to is lower extremity myalgia, or muscle soreness. This is very common with statin medications that people might be on. So these are all of your Lipitors, Crestors, like all your statins, Pravastatin, all those types of things. They a lot of times will develop this muscle soreness, and the patient might not even realize it was related to the statin. As you're talking with them and doing things in home care, they'll just talk to you about how, yeah, my legs are just so sore, and my thighs get tired, or achy, or things like that. You know, we can talk to the doc. There's different types of medicines they can try that have less of those side effects. So it doesn't mean they have to come all the way off anti-lipid meds. They might just try a different one instead. So the red flags are contraindications. We've kinda already touched on all these, but I wanted to specifically talk about the major ones here. So any of that chest pain that doesn't go away, any abnormal resting vital signs beyond what we said was sort of acceptable,

any moderate to severe changes in vitals with minimal exertion, moderate to severe EKG changes, or the new onset of an irregular pulse. Okay, so now we know what normal resting is. We know what normal exercising is. We kinda know some of the thinking about that can happen when people are exercising and their heart rates are too high or blood pressures are too low. Now we're gonna talk about, well, what do I do if I see these things? So heart rate guidelines, that rule of thumb, if the heart rate is increasing quickly and does not level off, decrease that intensity and kinda wait a minute or two. Excuse me, I just needed to get a sip of water there. So I'm doing ambulation. And then I go right into some standing single-limb stance stuff. Or I go right into some standing general conditioning exercises. And I then happen to check the heart rate. And let's say it started at 65. And now all if a sudden, I'm up around 100. I'm like, ooh, that went up quite a bit. You know, kinda back it off a little bit. Maybe stand, rest a minute or so. But otherwise, just maybe now I sit down and do some exercises sitting.

Check it again, and then see what it does. What's that guideline for how long you wait? There is no set number of minutes. Typically, I will tell people anywhere from one to seven minutes, with, really, three to five being the rate we want the most. And we'll talk about those a little bit more in a few minutes, too. But what we're gonna kind of see is, if it's not leveling off, we wanna just decrease and kind of see, will it level off, or does it continue to keep going up? The heart rate should not decrease. So as I said before, if it's going less than 10 beats per minute, you'd need to stop exercising and reevaluate the person at that point. Deborah asked a question, "Should blood pressure increase slightly "or moderately with exercise?" And we're gonna touch a little bit more on that in a minute, too. But really, what I would say is, it depends on how much exercise you're doing. If you're doing sort of minimal exercise, it's gonna only increase slightly. If you're doing more intense exercise, it's gonna increase moderately. And we'll touch on, when is that okay and not okay? So we're going back to the irregular pulse. I said we would talk about what to do about it. So the person had a regular pulse at rest. We did

some activity, and there was some kind of sign of it. They were short of breath. They were feeling a little lightheaded, whatever. We did a vital sign check, and now it's irregular. So we had a regular pulse, now it's irregular. Right then and there, stop exercise. Sit that person down. If their symptoms were bad, lay 'em down. Like if they just said, "I'm feeling a little short of breath. "I'm feeling a little dizzy," sit 'em down. But if they're starting to get mentally cloudy, they're not being as coherent as they were, they're really having major chest pain, then lie the person right down. But no matter what, stop what you're doing. If they had a regular pulse and now it's irregular, stop what you're doing, just rest. Don't decrease intensity, actually stop exercise and rest. Two or three minutes, check it again. If it is still irregular at that point, call 911. You don't need to wait longer, okay. You would rather err on the side of caution that it wasn't a huge arrhythmia and, oh, guess what? All they needed was a medication change. You'd rather err on the side of that versus that it's a major one that you can't see, and they're running the risk of cardiac arrest, okay. If you rested those two to three minutes, you check the pulse, and it's back to regular, I would still stop exercise for the day, and I would call the doctor while I'm there.

You may not get ahold of the doctor. You're probably gonna get a nurse. Might not even get the nurse practitioner or the PA, you're probably just gonna get an office nurse. Tell them what's going on and ask what they would like you to do next, okay. It might be that they want the patient to come in. It the be that they want the patient just to change medicine for the day, whatever. If you can't get ahold of anybody in the doctor's office at that point, then I would be okay leaving the person, as long at you document like crazy and educate the family like crazy that if the patient has any kinds of symptoms that are inappropriate that they should be calling 911. And I would make sure I followed up with the doctor the next day if you couldn't get ahold of 'em that day. EKG changes, this is if you had that ability to have EKG in front of you. So let's say that they had a stable arrhythmia at rest. So they had some PVCs, nothing major, just a PVC here or there. Just monitor it to make sure it doesn't get more severe. If it's now a

new arrhythmia or the existing one gets worse, again, stop exercise. Don't just decrease intensity, actually stop it. Have them sit down, rest that two to five minutes, and monitor what it does, as well as monitor your other vital signs. Because even if the EKG goes back to normal but their heart rate and blood pressures are off, you're still gonna wanna hold because of the vital signs. Okay, they all kind of go hand in hand. If it goes back to normal sinus rhythm or the baseline of whatever that arrhythmia was, then you could restart exercise, but keep them at a lower intensity. Because whatever intensity you had them at, it was a little bit too much for them. Or, depending on certain types of arrhythmias, you might need to stop for the day and call the doctor. I can't give you any hard or fast guidelines of which of those to do, 'cause it really depends on the patient. What I would say is, how stable were they? Did they have symptoms and vital sign changes and EKG changes? Then I would probably stop for the day and call the doctor. Or did I only see EKG changes that were worse? The vital signs responded the way they should have. And their symptoms, there weren't any real symptoms. It was just a feeling of a little bit of exertion.

They felt okay. That's when I might start exercise again but keep 'em at a lower intensity. So there's no perfect black or white answer I can give ya there. But take into account all three of those together: their symptoms, their vital signs, and their EKG. And then I look at, how stable are those three things together? Is only one off? Okay, maybe I keep exercising. Or are two or three off? Then I'm done for the day, I'm calling the doctor. They had this arrhythmia that got worse or was brand new. You sat them down, you rested them. You checked their vital signs. It's been about five minutes, and it has not changed, or it's continuing to get worse. That's when I'm gonna probably call 911. Now, let's say what it really was was more frequent PVCs, and they're still just having 'em. I might wait another few minutes for something like that. But if we're talking a-fib or heart blocks, or anything that's a little bit more serious, especially anything like a ventricular tachycardia or anything like that, you're just calling 911, okay. You wanna see those EKG get better or go back to baseline. Blood pressure

guidelines, so this kind of goes back to that question a minute ago. If blood pressure increases too quickly or too high, and how do I know when that is? Well, it depends. If you really are stressing the person, you're gonna see that moderate blood pressure change. So let's say I did five minutes of exercise, but the five minutes I did was stairs and walking, and that's very difficult for that person. I might see a big blood pressure jump, and that's okay. I'm just gonna stop exercise, have the patient sit down, have them rest a couple minutes, reassess it. Or let's say I was doing sort of minimal exertional stuff, and yet their blood pressure's really high. So let's say I was only doing some supine exercises, and their blood pressure shot way up, 25, 30 millimeters mercury above where it was at rest.

Now I might have the stop and reassess. If their blood pressure recovers, and they're asymptomatic, so they're not having chest pain, they're not feeling really short of breath, anything like that, similar to heart rate, we can resume exercise but at a lower intensity. If heart rate comes back down and blood pressure's on its way back down, again, that's great, you can resume it, but lower intensity. If the blood pressure increases more even while they're sitting there or it just is not coming down at all, you're either gonna call a doctor or 911. It really depends on the patient. So if they don't have blood pressure issues to start with, and their blood pressure is not coming back down, I'm gonna call the doctor, but if I can't get ahold of the doctor, I might be calling 911, because they shouldn't be as unstable, versus if I have somebody that I know has a history or hypertension. They tend to run higher here or there. They haven't gone up anymore, they're just not down yet. I might ask a little bit more about, when did they take their meds? What is their heart rate doing? That's when I might just call the doctor and kind of go based on that. So it's similar to heart rate and EKG that we were just talking about, that you take the whole picture into account. So the other vital signs, their patient history, and their symptoms. But this is where you really have to become that true sort of assessment person, and reevaluate and kind of look at the big picture, and talk with the patient. When in doubt, it's okay to err on the side of caution

and call the doctor. A lot of your home care agencies as well will also have nurses on call for your agency that you can call. That's an option, too. So if you can't get ahold of the doctor's office, you can always kind of call whoever your nurse on call is, or sometimes they'll have a PA, nurse practitioner, or a doctor that's on call. And you can kind of give the patient history and what you've been doing and ask what their opinion is. They don't have the patient history as much, so they're not the primary source you wanna go to. But if you've got nobody else, that's always a good option, too. If the blood pressure decreases too low with or without symptoms, you need to stop exercise. So blood pressure really shouldn't go down. As I said, if they were sitting, then you stood up, it might go down three, five, maybe six millimeters of mercury. If your blood pressure's starting to go down 10 or more millimeters of mercury, it should not be happening like that. That's somebody that's on the possibility of becoming hypotensive and having medical issues soon.

So definitely stop exercise. Start with sitting 'em down, but if their pressures are really low or they're having any symptoms, this is the patient you definitely might have to lie down to get their blood pressure to recover. Rest that two to five minutes and reassess. If the blood pressure recovers and they were asymptomatic again now, you can resume exercise. Try a lower intensity. You might have to change position. So let's say you were exercising in standing and that vasodilation response was too much for them. You might have to do some stuff in sitting instead so that their pressure won't drop as much. Otherwise, just monitor for their symptoms. Keep an eye on how they're feeling. If you gave them that two to five minutes' rest and the blood pressure is still low, and it's just not recovering, similar thing, we're gonna call the doctor. Or more likely here, we might be calling 911. Because they might be running the risk of going into an unconscious state or passing out, because their pressures are just too low. Oxygen saturations, we're gonna use sort of the 90% as our cutoff for most people, 86 or 88% for our chronic pulmonary patients. So you're exercising somebody with or without oxygen, that O2 sat goes too low, stop. Have them rest and perform breathing

techniques. Here's where you have to be a little careful. You have to decide which of the breathing technique is appropriate for that person. If it's somebody with a restrictive pulmonary pathology, we wanna do deep breathing. So what did I mean by that? These are people that have pneumonia, atelectasis, pneumothoraxes, multiple sclerosis, spinal cord injury, other neurologic issues, stroke. Any sort of problem that they can't usually get air in, that's when we wanna do deep breathing, because we wanna try and get more air in, getting more oxygen in, which will bring that oxygen level back up. However, on the flip side are our people with obstructive pathologies. So this is people with COPD, chronic bronchitis, so not an acute bronchial infection but chronic bronchitis, people with asthma, people with pulmonary fibrosis or cystic fibrosis. We don't want them doing deep breathing. I've seen a lot of PTs that just weren't, I don't think it's that they didn't know any better.

I think they just kind of got caught in the moment, and they weren't really thinking, and they had the person take deep breaths. That actually can make it a little bit worse. So especially with asthma, you'll see a lot of people trying to tell people to take deep breaths. We want the opposite. We want them to do pursed-lipped breathing, so prolonged expiration instead of taking a deep breath. Because what's happening with this person is the air is trapped inside. So that CO2 is building up. The oxygen is lower just because you can't get the old air out to get new air in. So instead of taking a deep breath, that doesn't really help us, 'cause there's no room to put that air, we need to do pursed-lip breathing, a nice slow, prolonged expiration to get the old air out, which will allow new air in so that that way they can get their oxygen level back up. It's not what they want to do instinctively. So people with COPD and asthma, instinctively, they're gonna wanna take deep breaths. And so this is why you, as the PT, really needs to remind them and teach them, no, do not take deep breaths. I want you to do that slow, relaxed breathing. So this is sort of the sound. Without the video today, I know it's a little weird to see me doing it. But this is sort of what they'll be sounding like with that asthma. And they're like, right. We want them to not take more deep breaths. We want

them to slow that expiration. So they'll sound like this. Even though that's still a very fast breathing and they're still taking that big deep breath, the more we prolong that expiration, the more we will be able to get them to slow that breathing back down, and we will get it back under control. And once it's under control is when we'll be able to get the O2 level back up, okay. So we've taken their rest. They've done whatever type of breathing was good. Their O2 sats recover, then that's great. We can keep exercising but just do it at a slightly lower rate. Or you can also then go ahead and add supplemental O2 if you have that. If you don't have that, again, that's not gonna help you. But if you have it, then you can go ahead and kind of do that. O2 sats don't recover, continue with the breathing exercises first. The oxygen levels tend to take longer to recover than heart rate and blood pressure do. So I say three to five minutes still, but you might need longer than that for oxygen levels. So continue with some of the deep breathing exercises or the pursed-lip breathing if it's an obstructive issue. If you have supplemental oxygen, add it. If you can't, that's when you're gonna wanna try and call the doctor. If you have to, then you'll call 911.

If you really can't get the oxygen levels up or you can't get their breathing to settle down, that's when you're gonna have to call 911. But most of the time, you can get their breathing levels to calm down and get those O2 sats back up. It might mean that you're done for the day, that you don't wanna do more exercise, 'cause they keep dropping. But you should be able to at least sort of get them back into a safe level. We had a comment, "These guidelines can also be applied "to some of your SNF patients." Absolutely. I'm specifically putting this towards home health, because that's sort of the series we're doing, but this applies to a lot of other patients, acute care patients, subacute and SNF patients, and even some of your outpatients that are still very unstable. And we had a question, "What are some of the examples of restrictive?" I did sort of answer that, hopefully you got that. But just to reiterate again, the restrictives are anything with difficulty getting air in. So your musculoskeletal issues, neuromuscular, like spinal cord injury, stroke, multiple sclerosis, Guillain-Barre, anything

like that, but then also pneumonia, atelectasis, pneumothorax, pulmonary embolism, anything sort of restricting that air coming in, scoliosis, kyphosis, those kinds of problems. All right, so now we're gonna kind of work our way through some case studies. So the first one, we have Mrs. Masood. She's a 71-year-old. She's got increased weakness and a falls risk. The history we have there, we've got a history of hypertension, stable angina, cataract surgery two years ago, a right total knee replacement four years ago. So what we've been called in for is that there's increased weakness and a falls risk. So the doc wrote the script, we've come in now, because we wanna kind of evaluate and make sure we're doing some balance and strengthening training to prevent falls. So we do our evaluation. The manual muscle testing and range of motion are within functional limits, except the right knee is five to 100 degrees. She never gained the best motion back after her knee replacement. Most of you won't do very specific manual muscle testing and range of motion. You'll do screens, and that is fine. It's whatever your company or your personal desires are.

So if you do specific range of motion, manual muscle testing, great. If you don't, it's okay if you're doing those sort of within functional or within normal limits, as long as you're okay with that with your facility or your company. She does have good sensation and proprioception. We've done some balance testing. I'm not gonna go into the very specifics of all of it, but you know, your general balance testing. It might be some tandem stance, single-limb stance. It might be dynamic shifting, reaching, those kinds of things. But during your balance testing, we saw deficits in dynamic standing balance. And you took vital signs at rest. Heart rate was 75, blood pressure 128/82. O2 sats are 98%, and that's with room air. So now it's your fifth session with the patient. You've spent the last 10 to 13 minutes doing some squat exercises with a four-pound kettle bell, some single-limb stance exercises bilaterally, and some throwing and catching exercise in tandem stance. So you focused a little bit on some strengthening. And then you went ahead and did a bunch of balance stuff. At this point, the patient reports mild to moderate chest pain, moderate shortness of breath, and bilaterally, the

lower extremities are feeling shaky. So we have to look at, what's our response? So how do we decide, okay, I've gone through a whole bunch of stuff with you today, how do we decide what our response is? What I would say at this point to you is every time you treat somebody, you gave them a prescription of exercise, or you did some manual stuff, whatever it was, think in your head, what do I want their response to be? Do I want their response to be that they might have a little bit of pain but not horrible pain, 'cause I was doing stretching for a knee replacement or something like that? Or do I want a little bit of vital sign change but not a lot? Or do I want them to feel a little weak, because I did a bunch of strengthening? What's the response you want to see? And then you look at, what was the response that I got? Does it match what I wanted? And if it doesn't match, how off is it? So let's say it matched what I wanted, great. I can keep doing what I want, keep going on with my plan. Everything is good. What is it didn't match? Well, did they do better than I thought they would?

So I gave them a bunch of strengthening exercises, and they don't even feel weak at all. They feel like it was nothing. Okay, I can keep going, but I'm gonna need to up my intensity more. Or they didn't feel a good response. It was an abnormal response. And then when I get to that abnormal response, I look at, how severe was it? So they had just a little bit of an abnormal response. Okay, I have to adjust according to that. Or, uh-oh, this is a bad response. I have to adjust according to that. So when I look at Mrs. Masood, I did some strengthening exercises and some balance exercises. I expect that those vital signs should probably have changed a little bit. They probably should go up a little bit, 10 to 20 beats sort of on that heart rate, maybe 10 to 15 millimeters of mercury blood pressure. Oxygen level probably stayed around the same. And I should probably feel the legs a little bit tighter, and that's probably about it. Well, that's what I expect. What's the response I got? The response I got is a mild to moderate chest pain, a moderate shortness of breath, and both legs are feeling very shaky. So the question is, did I get what I wanted? And the answer is no. So was it too easy? Do I need to push more? No. I got an abnormal response in the negative fashion. How bad

is it? Well, it's definitely not too bad here. She's not complaining of crushing chest pain. She's not about to pass out on me. She's not complaining of diaphoresis. She's not complaining of getting foggy mentally. Okay, so we're definitely not at a point we have to call 911. But we're definitely in an abnormal response, where things didn't work the way we wanted 'em to. So what are we gonna do? Very first thing, just sit the patient down. Check her vital signs. Give her rest, okay. She's moderately short of breath. The legs are feeling shaky. She was having some chest pain. Let her rest, give her a couple of minutes. She doesn't necessarily have to sit there the whole five. Give her two minutes', three minutes' rest, see what you think. Ask about symptoms during that rest. You know, that chest pain, is it getting any better? Is it about the same? Do the legs feel better now that you're sitting down? How's your breathing? Is it starting to feel better? Is it still the same? Ask those kinds of questions while she's resting. The other thing, because she was having chest pain, ask if she takes a nitro.

So we had a history of an old MI. Does she have nitroglycerin prescribed? If so, she might wanna have it nearby, handy, in case you need to take it. And it's up to her if she decides she wants to take it or not. Typically the prescription is that the patient can take it, and then they're gonna wait and take another one, and then wait and take another one. And then after three, we have a medical issue. But if she doesn't want to, if she says, "No, I think it's gonna go away," then she doesn't have to take it. If she's never been prescribed nitro, if she looks at you and says, "Huh? "I don't know what you're talking about," well, then you know that's just not even an option, and so you progress as if that's not there. So let's say, after four minutes, the symptoms were unchanged. She's grading her chest pain about a one out of four on an angina scale. And there are her vitals. So 113 for her heart rate. 152/87 for her blood pressure. O2 sats are 97. I'm gonna show you those resting ones again. Okay, so she was 75 and 128/82. Now we're up at 113 and 152/87. And this is after a four-minute rest, okay. So we're definitely still seeing an abnormal response here. We would have liked that heart rate to be coming back down at least into the low 90s by now if not into the 80s. Blood

pressure, we'd like that to at least be coming back down into the 130s or so, if not down into the 120s. So we're definitely, after four minutes, she's still having chest pain, and we're still having vital signs up there. If she had nitro, now is when she's definitely gonna take it. If she didn't have nitro, we're still not in a medical emergency yet, okay. And that's that kind of grading in your head. When do I say when? When can I keep pushing them? When do I call 911? When do I just call the doctor? You constantly have to rethink in your head, where am I in the picture of a medical emergency versus a stable, perfect person progressing well. 'Cause there's usually that big, long spectrum in the middle. So at this point, she's still not where we want her to be. But she's not at a medical emergency point, okay. Her chest pain is still kind of low. The heart rate's not horribly high. The blood pressure's not horribly high. If the chest pain doesn't resolve after another three or four minutes, though, that's when we need to call 911, okay. Because that chest pain should not be there. It should go away as she rests. And if it's not, especially because she didn't have any to begin with, and she doesn't have a stable angina as a diagnosis, we don't wanna keep that chest pain on there.

So let's say we waited the 44 minutes, and the symptoms resolved. So the chest pain's gone, and there is our vital signs. That heart rate came back down almost near resting. The blood pressure came back down almost near resting. Oxygen's looked great the whole time. So this is when we grade that response. Okay, it came back to resting. It took us four minutes or eight minutes to get here. But we got back to that normal response. Can I keep doing exercise or not? I would say, at this point, yes. When you've recovered to a baseline value and symptoms are gone, then you could exercise here again. But you're gonna need to keep your intensity lower. Because you know if you push, you're gonna go right back up to those higher limits, and the chest pain's gonna start. And then you're just back at square one, where you have to sit and do nothing again. You would rather exercise at a lower intensity and be able to continually exercise versus push at a high intensity and have to stop and rest for 10 minutes every time. First of all, you don't have that kind of time in your schedule in a day to spend an

hour and a half at somebody's house because you have to give them rest every five minutes or 10 minutes. But the other reason is, it's just not beneficial to them. You know, it's kind of like when we talk about low intensity, long duration of exercise versus high intensity, short duration. There are times you're gonna wanna do a high-intensity exercise with somebody and really push them. But if this case is happening, where you're seeing an abnormal vital sign change with symptoms of chest pain, you don't want high intensity. You would rather have low intensity and longer duration so that you know they are staying stable. Now, I just talked a lot there about assessment. Okay. I'd be willing to bet that we have some PTAs on this webinar. The PT has to make the judgment call as to which patients they feel are safe for a PTA to work with or not. If it is a patient that really is going to require constant monitoring with reevaluation and modification to the plan within the session, they probably should not be seen by a PTA.

They probably should be treated by the PT. It is well-within the PTA's scope of practice to monitor vital signs and rest or exercise again based on those vital signs, okay. Because that's just a monitoring of the signs and deciding whether they can progress or not. But in this type of case, where I'm saying somebody needs continual reevaluation of their vital signs and what you can do, that patient probably should be seen by the PT and not the PTA. And so I just kind of bring that up here because it's important. And a lot of times, PTAs are the ones that will say this as well. They might end up with who they thought was a stable patient, they get into that home care setting, and they are assessing vitals and making decisions on their plan of care three and four times during the session based on vitals. That is well-within their realm to go back to the evaluating PT and say, "This person is not stable enough. "They really need constant reevaluation. "I believe you should pick this person back up, "and I will take a different person." The same with the PT, if the PT realizes this person's changing too much. So I don't want you to think a PTA cannot treat somebody that has, that vital signs need to be checked, because they should. I mean, it's well-within the scope of practice for a PTA to assess vitals and determine if they have to just rest or keep

exercising. But it's when they require frequent reevaluation of those vitals and frequent modifications of the plan based on those vitals, then that person should be treated by a PT and not a PTA. And that's where our great team dynamic comes in. I mean, I have always worked with really good PTAs. I feel comfortable with which patients I can give them. They feel comfortable with which patients I give them and which patients I didn't, that they might come back to me and say, "No, that person shouldn't be with me." So it's important to have that great team dynamic with PT and PTA. So our second case, we've got Mr. Lindgren. He's a 77-year-old, five days after an L4-5 laminectomy. Excuse me, just need another drink of water. He has a history of hypertension, diabetes, obesity, GERD. He had prostate cancer treatment five years ago. But he's been clean since then. And he had a splenectomy 11 years ago. Your manual muscle testing and range of motion were within functional limits. He has good sensation and proprioception.

You did balance testing here without any major deficits. The laminectomy wound is clean and dry. And he has pain at rest, about two out of 10, at that low back incision. There are his vitals. So he's got a heart rate about 80. Blood pressure, 142/80. And oxygen levels are 99% on room air. So you've worked with him a couple times now. It's your third session. You've had him doing some step-ups, some squats, some lower extremity standing exercises, all only with body-weight resistance, though. You also had him ambulate 100 feet without a device with supervision. He's reporting mild shortness of breath and fatigue, and pain three out of 10 at the surgical incision site. So the question is, what's your response? So we go back to sort of that decision tree of, what did I expect his response was gonna be? I had him do quite a bit of conditioning exercises, although it was all only body-weight resisted. And I had him do 100 feet walking without a device. So I would expect vital signs'll probably go up a little bit, not too high. RPE or his exertion levels will probably be around that somewhat hard level, maybe a little bit lighter than that. Probably be a little bit short of breath, a little bit tired. Pain might be a little bit worse in the back. Maybe a couple points up, it shouldn't be

too bad. So that's what I expect. Then we look at, what are we seeing? That actually mimics what I would expect to see. So he's got mild shortness of breath, little bit of fatigue, and that pain. So I am gonna let him sit down, just because I just did a lot of activity. I mean, all that activity probably took us at least 10 or 12 minutes if not more. And he did just have, depending on how long it's taken me to get this number of sessions, he probably had surgery about two, 2 1/2 weeks ago. So he's still gonna be a little bit less endurance-wise. So I'm gonna sit him down, check his vitals. I'm just gonna use a pulse ox here. Because he doesn't have a primary cardiac issue, I'm not too worried about it. I pop the pulse ox on, I get a heart rate 95 and 98. Why not check full vitals or company policy? The reason I put this here is some of your home care companies will mandate that you have to check blood pressure, too, and it's on that screen that you have to plug in blood pressure before you go to the next screen. If that's the case, you're gonna have to check blood pressure, too. If not, again, he's not a primary cardiac person. That just happens to be in his history. I didn't stress him out to where he's having abnormal symptoms. He's just a little fatigued, a little short of breath.

So I might just pop the pulse ox on him, get a quick heart rate and oxygen level. If they look good, and he's feeling better as he's sitting there, then I'm in great shape, okay. If your company requires blood pressure, too, then yes, you're gonna have to take a blood pressure. So we took a heart rate, 95. If that company required it, we took it. And it's 149/84. Oxygen levels are 98. So what do we do now? So this is not four minutes later. This was right when we sat him down and we popped the pulse ox on him. This looks great, okay. It goes back to that, what did we expect to see? And are we seeing that? We expected to see slight increase in heart rate, slight increase in blood pressure, little bit of that fatigue level. So at this point, he is doing right what we expect him to do. So when we look at that when to say when, we don't have to say when here. He's doing great. We can continue to progress him along and do well with him. Okay? So our next case then, Mrs. Kleinschmidt. She's a 52-year-old, nine days after an L4-5,

whoop, sorry, that L4-5 shouldn't have been in there. It should have just said after a small bowel obstruction repair surgery. And she has hyper lipidemia and had a hysterectomy 30 years ago. So manual muscle testing and range of motion were within normal limits. We had good sensation and proprioception here. Balance testing was good, no big issues here. The abdominal wound is clean and dry. Pain at rest is about one out of 10 at that abdominal incision. At rest, heart rate was 76. Blood pressure's about 128/74, oxygen level, 99%. So it's our second session with her. We had her do some ambulation. We had her do some squats and lunges holding a two-pound weight centrally. So we didn't have one pound in each hand. She just had a single two-pound weight, was kind of holding it in front of her to do squats. And then lunges, she kind of just held it right up against her as she did some lunges. Then she ambulated 75 feet without a device independently. And she ascended and descended four steps with a rail with a reciprocal pattern. She got some mild to moderate fatigue, moderate shortness of breath, and the pain is six out of 10 at the abdominal incision. So what's our response? Take it back to our decision tree. What would we expect to see? Did she progress enough?

Or are we abnormal responses? And if it's abnormal, is it bad or really bad? So what would we expect to see here. Well, we kept that weight centrally, because she probably shouldn't be lifting a lot of weight, since it's an abdominal incision. We're only seeing her in her second session, so it's probably less than a week or right around a week since her surgery. It's okay for her to have that two-pound weight centrally, because she's gonna have to pick things up and carry things. So what we did were okay exercises. We would expect little bit of vital sign change, probably not a lot of blood pressure change, probably more heart rate change. Because what we did wasn't necessarily a long duration of time. So we had her do 75 feet of ambulation, some squats, lunches, and stairs. Squats and lunges and stairs are definitely gonna work those lower extremities a bunch. We didn't say exactly what kind of level she was in before this as far as her functional abilities, other than to say that she had strength that

was normal limits. And she was really just for an abdominal issue. So I'm not sure how weak or strong her legs were, but even if she was fairly strong, these are very specific lower extremity exercises that are probably gonna jack her heart rate up pretty fast. So we do expect the heart rate'll be up a little bit. Blood pressure, though, probably won't be up as high because of that duration. So this goes way to the question a while ago of, how much should blood pressure change? It just depends on the intensity level and duration. So in this case, although we did some more moderate-intensity exercise, it was a shorter duration. So heart rate's gonna change a bunch. Blood pressure probably shouldn't change much. We should see some sort of fatigue, little bit of lower extremity fatigue. In this case, that moderate shortness of breath is probably okay, because we did have her doing some pretty intense lower extremity things. The pain at the abdomen, the six out of 10, you know, it depends whether that's an okay thing for the patient or not. That is a pretty big jump. She was at a two or three to start with. A one, she was at a one to start with. So now at a six, that is a pretty big jump. So we are gonna need to kind of reassess there. And was it maybe holding the weight that was too much?

Or was it the movement, too much? We'll have to kind of figure out there. Squats and lunges especially are gonna require core stabilization. So it could be that those particular exercises were just a little too much for that incision. And so we might have to just modify which exercise we use. So what are we doing? We're gonna have her sit down and rest, just because she is short of breath. But we're gonna check those vitals. This is not a primary cardiac person. So just like on our last gentleman, Mr. Lindgren, on her, we're just gonna check with a pulse ox unless your company mandates that you take blood pressure. But I'll pop a pulse ox on her, and there you go. If I see it, I've got heart rate up 98. Blood pressure went up a little bit, more than I would have expected, 156/88. Still not awful, but definitely more than I would have thought. I probably would have expected a blood pressure around 140-something over lower 80s or mid-80s. So what do I do now? Well, it definitely up. Everything went up a little bit

more than I expected. And as I said, that pain was up quite a bit. So at this point, I don't think I can really just call this a normal response and go back to exercising. I think I have to do a little bit more. So what do we do? Let's have her rest a little bit longer. During that rest, have her take a few deep breaths. Now, the big thing here is, she's gonna wanna breathe with her chest, because it's gonna hurt her abdomen, and especially through that incision, to breathe through her diaphragm. We want her to make sure she is breathing through her diaphragm, though, or with her diaphragm. So you the need to teach her splinting. So that's that second bullet there. Giving her a pillow, a rolled up towel, something like that that she can hold compressed against that abdominal incision, it gives external support so now she can use that diaphragm and take some deep breaths without causing even more pain through that incision site. It's also important here to really educate her on that importance of the deep breathing. A lot of times people that had abdominal surgeries will have been, sorry, will have been given incentive spirometers. If she still has the incentive spirometer, it's a good thing to kind of revisit that, too. How often could she do it during the day, using splinting while she does it, anything sort of to keep that oxygen level up, because she's able to breathe more using the proper diaphragm. Recheck that oxygen saturation. If it's looking good, then we can probably continue with our treatment. I would also assess that pain as we keep going, too. If the oxygen level's still low, I would try come more focused breathing. It wasn't too bad, okay.

Again, it was 89%, so it's not too, too bad. But we definitely wanna get it back up. It started up around 96, 97. We need to get up to that level. If you've given about 10 minutes, you've done some very specific breathing, some deep breathing, you've taught her splinting, and that oxygen level still is not coming back up, it might be at 90, but it's still hovering right at 90, that's when I would call the doctor. You do not need to call 911, okay. This isn't a medical emergency. But we do need to call the doctor's office. If you can get ahold of the nurse, talk to 'em then. What if you can't get ahold of the doctor? Well, I'm probably done for the day. I'm not gonna do any more with her

today, because I can't get that oxygen level to recover. But I'm gonna make sure I follow up with that doctor as soon as I can, whether that's later that day or the next day. And I'm gonna educate the family members. If she starts having more shortness of breath, if she starts feeling any kind of lightheadedness, dizziness, heart palpitations, anything to go along with that, then they're gonna wanna call 911. It is probably not likely that she is having a PE here. But it's always important after a surgery to make sure that the patients kind of know those symptoms, because it is a possibility. And so that's why I would educate on those symptoms of extreme shortness of breath or palpitations or dizziness, or any of those types of things, because if you can't get ahold of the doctor first, you wanna make sure that if anything like that happens, that they know enough to call 911. You don't want them to just think in the back of their head, oh, well, yeah, but my therapist was talking to the doctor. So even though I feel like this, it's okay, 'cause they're talking to the doctor. It's not okay if you've left that house and they're feeling these symptoms hours and hours later. So now we've got Mr. Wachowski.

So he's an 81-year-old man, increased weakness and shortness of breath with activity. He has a history of COPD, hypertension. He has an MI eight years ago with a stent. He had a renal stent placed four months ago. He had a left total hip replacement six years ago. And he had a thyroidectomy 30 years ago. So you are being called because he's got increased weakness and shortness of breath with activity. All right, so he's not feeling well. I'm just starting to feel like I just, I can't do as much. I'm short of breath all the time, I'm feeling weak. So the doctor has you kind of come in to see him. You do your eval. Manual muscle testing and range of motion's within functional limits. I mean, he's definitely got some weakness there. But he is 81 with a pretty moderate medical history. I wouldn't say he's got severe medical history. But he's got some medical history there. So he's definitely within functional limits with a little bit of deficits. Sensation's slightly decreased in lower extremities. But he does have good proprioception. Balance testing, we notice some slight deficits, in dynamic standing

especially. And then there are his vitals. At rest, heart rate is 68. Blood pressure around 125/78. O2 sats, 97% on room air. So you worked with him the first day, kind of really just did his evaluation and maybe a little bit of intervention with him. Now it's your second session. You have him do some ambulation. You did some dynamic standing exercises for about three minutes. You did some standing lower extremity exercises. And by this, I mean some strengthening sorts of things, whether that's squats or marching in place or toe-tapping. You did some kind of general conditioning, sort of lower extremity exercises in standing. Did that for about five minutes. And then you had him ascend and descend six steps with a rail and non-reciprocal pattern. At this point, he's got moderate fatigue and shortness of breath. And he's got moderate coughing. And the sputum is moderately thick, and it's green. So go back to that decision tree. What did we expect to see, and how is he progressing? So we didn't do light exercise. I mean, we did sort of mid to moderate exercise here.

We had him ambulating. We did dynamic balance for three minutes. We did standing exercises for five minutes. Then we did some stairs. So we've probably done about 11 to 14 minutes' worth of exercise here, finishing it up with stairs, which are definitely a tougher sort of thing. So we would expect to see heart rate's probably gone up quite a bit. Blood pressure probably has gone up. Oxygen levels, we would have expected to be probably around the same. He doesn't have any true cardiac or pulmonary issue going on right now. They could a little lower just because he does have the chronic pulmonary issue of the COPD. So that's what we're sort of expecting. What are we getting? We're getting moderate fatigue and shortness of breath, maybe a little bit more than we would have expected, okay. We probably would have expected min to moderate fatigue. But the sputum is a big issue here. We would not have expected him to start coughing a lot. He does have a pulmonary history, but it wasn't anything that was acute. So the fact that he's now coughing more, and it's a thick sputum that's green, that is definitely something we're gonna need to evaluate more. So we're gonna have him sit down, and we're gonna check his vitals first. We're also gonna ask him

some questions about the sputum. He does have a pulmonary history. So is this something that happens? Do you have a lot of coughing during the day? Is it related to position? Is it related to activity? He might tell you, "Oh, you know what, when I get up in the morning, "I cough up all kinds of stuff, and then I'm fine all day." Okay, well, that's not what we just saw. We saw this after activity. Or, "You know, I just cough intermittently "throughout the day, it's really, once I start working more, "that's when I cough." Okay, well, now this is related to activity. We kind of expect that. But now we probe it further for that frequency and that color and thickness. Is it usually this thick? Is it usually this much? Is it usually green? If he's saying to you, "Normally, when I cough, "it's a dry, hacking cough," this is different, we're now seeing a thick, green cough. Or if he says to you, "You know, normally, when I cough, "I cough up a little bit. "it's usually yellowish or green," okay, now we're gonna ask, is this similar to what you usually have? So it's really important to kind of realize this wasn't what we expected originally. But now, is it his normal or not? Because we just don't know him well enough yet. We've only seen him twice.

Maybe we just didn't push him enough the first day, and this is his normal. So as we start asking him more questions, it comes out that he's been having sputum like this for about two days and has a productive cough about one to two times per hour. If that's what we were getting, we're calling the doctor. I mean, this is not his normal. This has only been going on the last two days or so. And it's definitely more sputum, and it's thick, and it's green. So this could be a sign of an infection. And so we would want to get this taken care of and really talk further with the doctor. If he had come back to you and said, "Oh, no, this is what my sputum is always like. "Yeah, I'm always coughing up this green stuff. "It just happens every time I'm active," then I'm not as worried about it, because this is his normal, and I'm okay with that. Maybe we just need to look at some other techniques to help him with that, some positioning techniques, some coughing techniques, things along those lines. Okay. So I kind of wrapped up there. I don't wanna get right into questions yet. Because I kind of wanna

just sort of wrap back around some of these things. Because as I mentioned in the beginning, I don't have specific numbers I can give you. And I really wish I did, 'cause I know that's what a lot of you want. Some of you may have felt like, oh, jeez, this was sort of a review, I'm already doing this. That's actually a good thing then. But you probably would come back with some new things that you didn't quite think of before. What I would say is, every time you get in and you're treating that patient, sort of come back to that decision tree that I just went through with the four patients. What do I expect to see? Did I get the response I wanted? If the response is lighter than I expected, well, I need to push the person even more. And that's okay to realize that, that I'm not pushing the person enough. I think that happens a lot with us, especially in acute care, in subacute care, and in home health. We don't push patients enough. We're used to kind of them being more frail, being more poor endurance, more medically compromised. And those that aren't, we don't push enough. So if you've got that response that's maybe a little lighter than you expected, push them more. You know, I purposely gave you examples today us kettle bells, using squats, using lunges. We can use those higher-level exercises and just modify them to what level our patient can do.

And the more we do that, the better off our patients will be. If they respond exactly the way we wanted them to, then great, keep going with everything you're doing. The pieces I really gave you today are the ones you see the most often. It's the reason you decided to take this webinar, because you have those abnormal responses, and you're just either very unsure of yourself, or sort of sure of yourself but just not 100% sure of yourself what to do. That's when you then decide, okay, how bad was my response? And always think of it in terms of that grading scale of, am I at a medical emergency point or not? All right, and that's what I sort of use as my scale. I always tell students, and I tell a lot of clinicians that I work with, you really should never have a patient die on you. If a patient died on you, it's either because you missed all the signs and symptoms and were stupid, or it just was bad luck that it was their time to go and you

happened to be the one that was in the wrong place with them. Grade on those scale of how they responded. If they're now at that point it's a medical emergency, it doesn't necessarily mean you did something wrong. It means that they're very fragile still, and their body's not capable of that. And you need to act now to get them the medical help they need. If you're in a subacute or SNF or an inpatient setting, get help that way. If you're in home health, call 911. Do not hesitate to err on that side if you're at that point where you feel this is more of a medical emergency. Most of the time, you won't hit that. You'll hit that gray area in between. Slight changes here, slight changes there, what do I do? Always go back to rest and vital signs checks and symptoms checks, okay. So if you're giving that person two, three minutes of rest, and then you see how they respond, give them two, three more, see how they respond. If they're not coming back down to where you want them to be, or back up to where you want them to be in regards to oxygen levels, that's when you know that you need to then do something further from that.

Do I have to call the doctor? Or do I have to do something else? All right, so that's what I mean by that, where do we go with that grading? Okay. I can't say enough that you allow them to get the time to rest, too. So I use that sort of two- to five-minute rest period. But it's okay if you have to go another two to five minutes past that. It's within that first two to five minutes, though, you should start to see those values come back to where you want. And you should start to see those symptoms go away a little bit. There was a question, "Do you normally take respiratory rates on your patients?" It really depends on the patient. Your general, typical patient, I wouldn't bother taking a respiratory rate on. Because you just know that they're gonna be sort of normal when they started, and then they got more short of breath. On your pulmonary patients or your patients that tend to be more medically unstable, that's when I might take respiratory rates. And I didn't go through the specifics a lot here. But 12 to 20 breaths per minute is a normal resting respiratory rate. You should see respiratory rates go up anywhere, five to 10 breaths per minute for minimal exercise. As you get more

moderate exercise, you'll see those start to go up eight to 15 breaths per minute. If you're doing vigorous exercise, you might see those go up 15 breaths per minute, 20 breaths per minute. It just depends on how much you're really stressing the person. Most of your patients in home health, you're not gonna see that. You're doing maybe high intensity, but it's a short duration or a lower intensity, long duration. So you'll probably see their respiratory rates go up anywhere from about five to 12 breaths per minute from where they were at rest, all right. And so you can definitely take respiratory rates. But I usually will only do it when it's somebody more with a pulmonary issue or that has more medical instability or endurance issues. Because a lot of times you'll be able to gauge all of that off of heart rate, blood pressure, and oxygen saturations, a little bit more than respiratory rate. Because a respiratory rate's a little bit less, I don't wanna say accurate. It's a little bit less of a predictor of where they're at. Because you can do lots of things. Like, I can walk up a flight of stairs and be short of breath, and yet I'm not medically unstable yet. It's just the stress of that activity might have made me short of breath versus my heart rate, blood pressure, and oxygen saturations might be fine. And so that's why it's not quite as good of a predictor unless the person has instability or, again, pulmonary issues.

So sort of my wrap-up is, again, kind of take each case into account and really look at their full case. What is their medical status? What is their medical history? What have they been looking at at rest? What did I ask them to do? And that's how you find that, when do I say when? When is it too much? When is it not enough? When is it just right? And so it's grading within there, how do I adapt or change my exercises accordingly? Okay, so at that point, I will open it up if people have other questions. If you have specific patient questions, that's fine too, or if it's more just, Presley's question, like, "Do you check respiratory rate?" Things like that. So I have a question, "I've been working "in the cardiovascular, pulmonary, "multiple medical complex patients for 41 years. "I love this." I can't see if there was a question there. Oh, it might have just been a comment that they liked this. Well, thank you, I'm glad that you liked

it. Sorry, I don't get the bottom of the question right away, so I wasn't sure if that was a question or just sharing, but I'm glad you liked it. Any other questions out there?

- [Calista] All right, well, I don't see any other questions either coming in. So it looks like we're gonna go ahead and wrap up today's course. Thank you so much, Dr. Bartlo, for sharing your expertise with us today.

- [Pamela] Thank you. And just the last thing that I didn't click through them all, but all of the references are after this. So feel free to go through all those references for anything that you guys might need to. And if you ever do have questions in the future, don't hesitate to contact me through email or social media. And I know PT.com has my contact information as well.

- [Calista] All right. Well, thank you, everyone, for attending. And thank you, once again, Pam. Have a great day, everyone.