Geriatric Pharmacology: PT Role and Responsibilities
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- - [Host] Our presenter today is Dr. Jill Heitzman. Dr. Heitzman is an associate professor and Director of Physical Therapy at Maryville University. She has a history of teaching courses in geriatrics, neurological physical therapy and tegumentary pharmacology and research. She has been actively involved in The Academy of Geriatric PT, holding various offices including director, vice president, CSM program chair and currently serves as a co-coordinator of the CEEAA courses. Dr. Heitzman also serves on the Gerinotes Editorial Board, a manuscript reviewer for the Journal of Geriatric Physical Therapy and has written educational monographs, published peer review articles, coauthored book chapters and presented on various topics related to the aging adult at the state, national and international level. She has also been involved with the Academy of Neurological PT and various state chapters. Currently she serves as the ACAPTE liaison to the Educational Leadership Institute and as a member of the Accreditation Review Team for the American Board of Physical Therapy Residency and Fellowship Education. So at this time, I'm gonna turn the microphone over to you Dr. Heitzman. We are so pleased to have you here with us today.

- [Jill] Thank you very much and I'm very excited that so many people signed up for this course. This is a topic that's really very passionate of mine and I'm hoping that you'll be able to go away from the course with some things that you can actually use. We need to go through a little bit of the outcomes so that after you get through with this course. I want you to be able to have at least two aspects of the role of PT in managing a pharmaceutical interventions to define the impact of pharmaceutical interventions on the PT plan of care and to accurately differentiate between the adverse side effects with normal physiological aging versus common pathologies that we see in this older population and to have at least three identified needs that would cause you to refer to other healthcare providers based on these pharmaceutical interventions and to have two resources to educate aging adults on issues related to the pharmaceutical profile and polypharmacy. So I've set up this course so that we start talking more about some

of the issues related to outside stakeholders in pharmaceuticals and PT's role then going into some of the other issues that affect aging adults followed by going through the different systems with aging changes and how that affects pharmaceuticals as well as having some cases between there. Hopefully we will get through this entire presentation and be able to have it as some case interaction that we can go back and forth on, but if not, some of those cases, you'll be able to use for yourself to continue to apply this to your practice.

So when we first look at the medications in older adults, there are a lot of statistics out there. The medications are very much involved in this population, this population has multiple chronic illnesses and these chronic illnesses may have been going on from the time they were young adults and they've been aging into this population with these chronic conditions and they're seeing multiple different kinds of physicians, primary care providers as well as having multiple prescriptions filled every year. These prescriptions and chronic illnesses do account for the large percentage of hospitalizations and those that are on these multiple medications are more likely to have some of the hospitalizations to things that we can even possibly prevent with some of the adverse reactions.

So when you're looking at what we have to do with medicational management overall is perform those assessments, we need to be looking at that medication review to see if there are on multiple mediations that are very similar to each other or that may be impacting each other. The physicians and the primary care providers would be formulating those medication treatment plans but it's our responsibility to even review them in relation to our plan of care. Monitoring the efficacy and safety of this therapy. So are they following the prescription correctly, are they storing it correctly, are they taking it correctly, is it with food, is it without food, is it in the morning, is it in the evening? And that helps to ensure that adherence, it also helps to ensure that we are empowering and educating patients and that we are documenting to other providers

what is actually happening. So we look at physical therapy and medications itself. Dr. Rothstein made this statement in one of his editorial reviews back in 1995 that we can no longer afford the luxury of considering our efforts independent of other practitioners. We cannot develop a care plan and evaluate the care plan if we are not considering what is happening with those medications as well. And then we really need to think about how we're exercising patience and understanding that cardiac functions and metabolism and how they're responding might be influenced by their medication. And that was really one of the early times that people started saying, hey as physical therapists we need to consider the medication profile.

Dr. Ciccone has taken that even further in his article that he actually wrote in the same monograph that most of our patients are getting some form of pharmaceutical intervention and some of our interventions can be synergistic where they're working along with those medications or they can be antagonistic that they might be working against the medication. When we think about exercise and application of any of our physical agents, those can affect the pharmacokinetics of a drug. And they really have the greatest impact on absorption and distribution of drugs, so how they are absorbed in the body, how they are distributed around the body and we need to consider that.

The APTA made a House of Delegate Statement back in 2013 that physical therapists need to integrate an understanding of the patient and client's prescription and nonprescription medication. When we're looking at their overall health, impairments, functional limitations and that includes looking at the administration and storage of medications that we are actually using in our PT interventions themselves and that all of this is within our scope of practice. The normative model of PT that actually came out before that House of Delegate Statement back in 2004 had pharmacology as a content area that included all of the pharmacokinetics, pharmacodynamics that affect the patient in our plan of care. The Guide to PT Practice at first came out in 1983 and then has had some revisions since, also utilized the gathering of the pharmaceutical

interventions for their current, their previous and any other conditions. But it's more than just gathering, it's what are we doing with it. Are we reassessing it when they go back to the physician? Are we reassessing it as their conditions change? Other stakeholders have included pharmaceuticals as part of our standard of care with the CAPTE standards in Standard 7A, that academic institutions have to show how they're talking about pharmacology. FSBPT on the analysis of practice just recently for the national PT exam even talked about the fact that clinicians are saying we need to understand pharmacology, we need to apply it to our plan of care. The Centers for Medicaid and Medicare Services clearly states that PT can collect and review medications on the OASIS. And the joint commission, quality identification talks about documenting these current medications.

But there is one little caveat is many other state practice acts haven't caught up to all of the other issues. All of the other stakeholders reports that this is within our plan of care. And with looking at all the state practice acts, there are many of them that are silent on this topic and if they're silent on the topic, then we refer to other stakeholders to justify our role. Some, if not most, have also required that unlicensed personnel can administer only under the direction of a nurse or a physician. And this was actually to cover the family members administering medications. It really doesn't talk about physical therapists since we are licensed persons. Some of the facilities and states have specifics on these self administered meds regarding what can be done and what can't be done.

Some states say that PTs can monitor medications as per the Centers for Medicare and Medicaid Services. This was a major discussion at the FSBPT annual conference that I attended in November of 2017 because some states are starting to make some changes regarding some of the topicals used in PT, some state that we have to refer questions to other providers and that we can only provide education. So at this FSBPT conference, there was a presentation on PT's role in pharmaceuticals and that got to

be a pretty lively discussion because if the state boards are there for protection of the public, then part of our roles, since it's in the scope of practice, is to see is this medication safe for the patient and the safety of them in relation to our PT plan of care. So we really have been looking at more and more of these things coming out to different states but as we go in we need to keep telling these state licensure boards, the stakeholders that are in there from Centers for Medicare and Medicaid service joint commissions and our own stakeholders with CAPTE and FSBPT have all stated this is within our scope of practice, not prescribing medications but educating them, assessing the impact on our plan of care and helping it to develop what is happening with our plan of care.

So we look at the impact on the PT plan of care. We have interactions between PT and some of the drugs, everything from the physical agents. Does the heat increase circulations to have distribution go faster? Does the cold decrease circulation to have it stay in a local area? What happens with exercise, massage and even the impact on cognitive function? And this is becoming more and more prevalent in the PT world and the PT plan of cares even though Dr. Ciccone actually stated this way back in '95. We're seeing more people starting to look at what did that drug do to my plan of care? And we're gonna talk about that a little bit more when we get into some of the systems. When we look at the international classification of function and we're looking at what it all includes, as you're starting into those social determinants of health, medication is one of the personal factors that is impacting function and impacting overall outcomes.

So let's shift just a minute before we start talking to the systems and looking at some of these aging issues. So one of the things related to pharmacology is we do have some increased drug use. Part of it has to do with those increased comorbidities that occur but with the changes in the aging physiological systems, the altered response to drugs can lead to adverse drug responses that we don't anticipate. So there is a relationship between drugs and function and that's where we need to focus our role

and responsibility is how do those drugs impact function. When we talk about older people taking more drugs, it's because they do have more illnesses and some of these are things are things they've aged with, some of them are complications of some of those illnesses that they've aged with. So currently, they do take more medications and more adverse drug reactions. It's a pressing issue. We have overuse of medications. We have patients who are going to multiple providers and getting prescribed multiple medications. We're having them taking over-the-counter meds that may be synergistic or antagonistic. If the doctor tells them that they need to take a break from it, they have a distress to that because they're controlling all of their activity by doing the drugs so why take a break.

But the biggest issue is nobody tells them to stop the medication. They go into a hospital on a list of meds, they get followed by why they're in the hospital for that acute condition, they get a list when they go out but nobody tells them and consolidates that with the ones that they were taking prior to the hospital admission. So when we're looking at over-the-counter meds, 14% of the population is over age 65 but they consume about 33% of the prescription and over-the-counter meds. And this is gonna increase as aging population increase.

So on average, they take four prescriptions and four over-the-counters daily. And the biggest thing is they go to different pharmaceuticals, they go to different pharmacies, they coupon shop but the average patient in nursing home uses about eight medications at any one time. And most people don't think over-the-counter are drugs. They are, "Oh yeah, I can go buy and so it's not a drug." But we have to remember many of the over-the-counter medications are prescription drugs at a lower dosage. There are limited studies on older adults. This is starting to change but when we're looking at how do you get a control group in this population, there are so many variations so that it's hard to get a really good control group. So we don't often know exactly what this is doing to the aging body. And so that standard adult dose is really

based on about the average 30-year-old. And our 30-year-olds are not the same as our 70-year-olds on physiological function. There's also little regulation on herbal medications. And some of these herbal medications are just as dangerous as prescription drugs because some of the prescription drugs have come from different herbs and so there's limited information available. And that's something we really need to consider because as everybody keeps going into these organic drugs and I want to be more natural, we need to help them understand that herbals are where many of these pharmaceuticals come from and so if they're taking herbals along with the pharmaceutical that is similar to it, they could be actually overdosing themselves. So we talked about this already about the fact that people in the older adults have multiple chronic conditions and they have different medications for them, but our role is really on that function.

So when we're assessing our patients, we need to consider age related findings and differentiate them from disease because there is some normal physiological aging that does occur. We need to help them understand that some of their complaints are not just part of aging. How many of us have heard patients say I have pain but I'm just getting old or I just can't do this anymore, I'm just getting old. Well, that's not really what we want to have when we're talking about living well and aging well. And then we need to think about polypharmacy and really what is it. It's really greater than three medications that either duplicate each other or they are prescribed for an adverse drug reaction not the primary condition.

So people who have more than four prescriptions are at risk for polypharmacy but that is not polypharmacy by definition. They may need to be on three or four medications due to their comorbidities but if they are not duplicating each other or they are not prescribed for an adverse drug reaction, it really isn't considered a polypharmacy condition. But then again, we don't recognize over-the-counter drugs as medications. We do have some behaviors that are out there of the older adult. And when you ask

somebody how they think they're doing, they'll tell you they're doing pretty good because they're comparing it to their friend down the street who's not doing so well. So they don't often freely discuss symptoms and some studies by Koronkowski and Pannu actually shows there were some differences between men and women and men have more of difficulty with some hearing changes based on some of their physiological changes and that may be that they didn't hear the instructions correctly. Females may have more problems with vision due to some of the aging issues that impact them differently so they may not be able to read the instructions. So that's a role that we can play in helping them understand their pharmaceutical prescriptions. And then we know that adverse drug reactions really is one of the most common reasons that people get admitted to the hospital. And it is also one of the most common contributors to complications while they are in the hospital because of these multiple medications they may be taking prior. So some of the risk factors for us to consider to contribute to adverse drug reactions is some of the changes in cognition that may occur.

Some of the changes in physical function that may occur due to inability to open up the pill bottles. They also have some side effects. If something makes them sick, they're gonna stop. And then they don't really wanna tell their primary care provider. The other action that we see a lot is they complain of adverse drug reaction and so somebody gives them another drug just to counteract that and that starts putting this cascade of multiple meds. But the complexity of drug regime is really one of the biggest issues that contributes to adverse drug reactions. How many of them have told us that they take all their meds in the morning or all their meds at lunch or all their meds at supper. And some of those meds may need to be taken without food or they should not be taken with the other meds. So helping them understand the different regimes can be one of our roles. But again, the number of prescribing physicians, the filling pharmacy, the childproof caps, all contribute to adverse reactions because it makes it for complications, difficulty following. Chronological age is not a risk factor.

And we really need to be helping people understand that. Just because on the calendar it says that you are 70 does not mean that that's a risk factor. We have to take their entire health history and social determinants to health to determine what risk factors they have for how we're gonna help them. So I'm just gonna quickly review some of the basic pharmacokinetics mostly in relation to aging physiological systems. And so if we're looking at physiological changes, we have changes in the cardiovascular, gastrointestinal, the hepatic and the renal systems that really decrease the blood flow, decrease peristalsis so things can't get through the GI tract quickly enough. If you're looking at these...

When we're looking at the cardio, it's mostly that flow so it does decrease the absorption and distribution. The slowed peristalsis of getting food through the abdomen does cause the variability absorption. And that's where if they need to be taken with food or without food can really make a difference. We also know if it depends if the drug is supposed to be absorbed in the stomach or in the intestines. We get into the liver and the hepatic system, the enzymes, how that impacts for metabolism making the drug more active or more inactive. And then when we have the decreased blood flow and the glomeration rate in the kidneys, we have trouble getting rid of it.

So now it's lasting longer in the body, it's circulating more within the body. So when we're looking at the four components of pharmacokinetics, the absorption, the distribution, the metabolism and the excretion, we can see how some of these drugs may last longer in the body. If we have fat-soluble drugs, they're gonna accumulate in the tissues and stick around longer because the aging adult has a little bit less leaner muscle and a little bit more adipose tissue. If we're talking about blood flow to the kidneys and blood flow to the liver where we have to metabolize with second pass in order to decrease the activity of the drug to eliminate it or when we have to eliminate it straight from the kidneys, the drugs cleared by those kidneys and metabolized in the

liver for the second pass may accumulate more. And so the effects may last longer. We need to realize that because patients that are on pain meds, muscle relaxation, they may be sleepier, they may be more relaxed overall. I tell people all the time, when we have a muscle relaxer, the drug doesn't tell the body, I'm just gonna go to my latissimus dorsi and relax that muscle. It relaxes all the muscles in the body. So if it's gonna accumulate more in the body then they're gonna have more fatigue and that's gonna impact function. So we do have sensitivity to drug changes too because of the cellular changes and the system level changes. All of the cellular levels mean that if I'm prescribed a drug for someone at age 30 and I'm age 70, my cellular level is going to use that drug differently and so I'm gonna have more problems with my orthostatic circulatory response, posture or balance, cognitive function and that's gonna all impact function. If we're not aware of these, we can't really help our patients. We have sensitivity in the beta stimulants. We have some that have some increased sensitivity.

So our sedative-hypnotics, our analgesics, the pain meds, those that help them sleep a little bit better at night. They're gonna hang around longer because they are more fat soluble. Then we have the additional factors. We've talked about co-morbidities. Nutritional status, what are they eating? That is becoming a big component of how the drug is effective in the body. Is the patient educated well on what they're supposed to do with it. The bigger issue is the hoarding and sharing of drugs because they don't wanna get rid of things. Many of our older population, not the baby boomers but the generation above that, they grew up during the depression where you don't throw things away, you save everything. So they have a hard time understanding expired meds and they share drugs. And that can become a problem. And that is because of some of the financial issues too. We need to think about some of these chemicals that are in our over-the-counter drugs and our societal drugs, even alcohol, a glass of wine may impact drugs, smoking, caffeine, may all impact drugs. Caffeine impacts the kidneys a lot so that may impact the excretion of the drugs. And we go into laxatives. Again, we're going through how we're emptying the GI track, well, they may end up

with diarrhea and it's going through too fast before it gets a chance to absorb. But then other meds may cause the GI track to go too slowly and that's where you get constipation. So they use the laxatives so we get this constant cycle. And then the analgesics and vitamins that are over the counter. I think I'll talk about this a little bit later too but I'm gonna mention it right now because all these analgesics that are over the counter, ibuprofen over-the-counter is 200 mg, prescription ibuprofen is 800 mg and higher and people don't realize if they're taking four ibuprofen over-the-counter, they're at a prescription level. So we do need to be educating our patients on that as well as being aware that they're at a higher dose and would safely recommend it. So again, polypharmacy is more than just the number of drugs. It's looking at the unnecessary medications and we can help identify that.

So features of polypharmacy, no apparent reason for the drug being given, duplicate, contraindicated drugs causing that drug-disease interaction which is really a small component of polypharmacy, that inappropriate dosing, using of drugs to treat adverse reactions. So we do have factors, these are things we can recognize so that we can help reduce the risk of polypharmacy. And there are some things that we can help with patient's expectations of 'fix me', helping them be motivated during motivational interviewing to help them improve function without the drugs and doing some basic education on healthy diets if we think they need even more we need to be referring to the dietician.

The consequences, just the increased symptoms that occur, the cycle that keeps going when they get the drug then they get an adverse reaction so they get another drug, now they have increased symptoms so they get another drug for those increased symptoms and it becomes a cycle. We have a role to break this cycle. I gave you this chart just to kind of give you some ideas of some cascades that lead. There's more out there but if we have arthritis, you get a non-steroidal antiinflammatory drug, it increases their blood pressure so now they get a blood pressure med. And so you could see how

if you go through some of these are crossed from hypertension, they have hypertension so they get a diuretic but they now complain if incontinence so now they're getting an antispasmodic drug to impact the incontinence. So all of these going across the line like these, and I'm sure you can all think of many other scenarios that people can have that lead down the road to polypharmacy cascade. So what do we need to do? Well, first off we should never assume a change of behavior is a result of aging. Somebody has a change of cognition suddenly, we need to be looking at their drug profile. Also it must not just not come on overnight, it's a gradual onset. So some of the things with postoperative derillium, that's a change of behavior, might be due to a drug reaction. We know toxic reactions can occur to lower doses.

So if they're multiplying their medications, they could have an ADR, maybe they forgot to take their morning meds so now they're doubling up in the afternoon and they're seeing a change of behavior. We can double check that. We do need to consider those over-the-counter meds. We need to be aware of many other adverse drug reactions that could be present and start addressing them, start referring them if needed but maybe addressing them in education. We need to evaluate every complaint of dizziness. People complain of dizziness more and more as they get older and think it's just a normal part of aging. We need to evaluate it. Is it orthostatic hypotension, is it a vestibular problem, is it a vestibulo-ocular problem or is it because of their meds? We need to think about the fact that fatigue and weakness can be caused by the medications especially some of your diuretics or antihypertensives that are commonly used in our aging population.

Unsteady gait, don't only think that it's a muscular problem, don't only think that it is something to do with the vestibular or the VOR or proprioception, it may be due to those underlying medications. And sometimes just getting them to sit down and talk with a pharmacist on all their meds. That's why they have Form Ds. They're supposed to be doing education and helping people consolidate all their meds before they leave

the pharmacy. We do have some basic syndromes with the confusion and delirium, the dizziness, vertigo, orthostasis and falls, anorexic and weight loss which can lead to frailty and lead to muscle decline to impact function, depression that then leads to isolation that then leads to inactivity that leads to falls, urinary incontinence that then leads to decreased hydration because they don't wanna have to keep running to the bathroom and that decreased hydration can lead to cardiac problems, cognitive problems and falls and then constipation that can result as well as the multiple combination of medications.

So if we're on a lookout for just these six things, we can play a really big role in reducing some of the consequences of overmedication. We do know pain management and medication is a huge issue. And if you've not seen the opioid epidemic, I think we need to have a discussion because that's been all over the place now and we need to think about looking at a comprehensive treatment approach in getting these people off of opioids. And that could be another hole too for our session. But we do know that CDC actually has included PT in these non-pharmacological therapies for getting people off of opioids. And that is a big step for us but we need to step up to the plate and see what else can we do. How do we control pain, how do we help educate them, how do we get them moving again in ways that don't require all this medication?

'Cause we know falls and medication go hand in hand. Falls are totally a major issue worldwide. We know that unintentional falls account for 85% of injuries and of that 55% of those related to fall end up into death. So if we can make a change by just looking at what is happening with their medication profile, it can be part of that multi-approach to reducing falls. Starting a new drugs seems to impact the falls most in those first one to two weeks as their body is getting used to it. So maybe we need to educate the family and the patient on a little bit greater fall risk management in those early times. So if you're in home health and they first have come out of the hospital

starting on new meds, maybe a little more conscious about some of these safety things as they're coming home and adjusting to the new medication. We do know higher doses impact falls and a lot of times those higher doses are done in those early times and then they gradually win off. People who are depressed that are on antidepressants, the antidepressants themselves can impact falls but depression also impact falls. So here is where we have a little bit of a balance that we need to get. How much of the med is going to control their depression versus how much of the med is gonna be too much it's gonna make them at a greater fall risk. And then again we go into the polypharmacy issues. This is just a short little list of categories of medications that are linked to falls.

So if we have patients who are on these, we may need to consider the functional impact. The diuretics that are here, I mean, part of that is linked to falls because when they have to go they have to go and then they may be hurrying and trip and leak and trip over the urine that they've spilled along the way. So maybe we have to educate them a little bit more about timed voiding while they are getting used to the mediation. For looking in some of these. Anticholinergics, that's a whole area that could be our entire presentation on because of the acetylcholine package that anticholinergic could affect a little bit of cognition while they're on some of these medications due to how acetylcholine is needed for cognitive function.

So we have several of these that are listed here that maybe you need to think about with your patients a little bit more regarding safety and fall risk implications. There's other issues related to drugs and I've given you a chat on this that really helps you kind of put them into categories. I think that knowing some of the drugs related to different problems that our patients complain of can help us go back to maybe helping them through it. One of the biggest ones that I think are important or these opioids that are given following total knee, total hip replacements, they're giving them for pain but they lead to constipation. And so now they have all of this abdominal pain and constipation

so they don't wanna get up and do activity and that declines that physical function. And then we already talked about the diuretics that can lead to falls and incontinence. More and more is coming out for this sleep apneas and finding out that some of the mediations are what led to the sleep apnea. And we know sleep has a huge impact on function and cognition which most of us know if we didn't get a good night sleep we feel groggy the next day and we're not thinking straight. Well, add that to the chronic conditions our older adults have and it can be multiplied. And delirium and depression. These are big issues that are coming out more and more impacting some of our population and impacting our aging adults. We have medications that can actually lead to more depression, people are on beta blockers for their cardiac condition but then they get more depressed. Delirium can be from a multiple different component and they can present as if they have cognitive impairments and people just say, okay they're getting old, they're getting dementia. We need to break that stereotype and start looking at the underlying cause.

So we need to rule out delirium. People who have infections may present with delirium, people who have electro-imbalances, hypo/hypercalcemia may present with delirium. A lot of our cardiac conditions present with delirium and a lot of our neurological components present with delirium. And one of the biggest ones that I have been doing a lot more studying on is the head trauma and the mild concussions that occur in our older adult following a fall that go undiagnosed. And this is one that presents itself with delirium that everybody thinks they're now going down the road to dementia.

So we need to be aware of function, these sudden changes of behavior, monitoring cardiovascular system, monitoring cognitive function to look for changes that maybe it is with their medication or with something else underlying that's that's going on. I'm gonna talk just a little bit about medication adherence because we need to think about that behavior that corresponds to our agreement with the recommendations of a healthcare provider. We went away from compliance years ago because it sounded

more intentional to adherence and adherence is still, did they really choose to adhere, choose not to adhere? And lately, people have been talking about it as a partnership. Does the patient and the provider, have they agreed on a partnership relationship in any of our prescriptions whether it be exercise, whether it be the medications or whatever that we're doing as far as an intervention with our patients. So we're talking about a medication. Did the patient actually buy in and agree with the provider? So we really need to think about the factors from the providers and the healthcare systems side, not just from the patients side. Do they truly understand what we're saying? Do they truly understand the why's? Do they truly understand that this is a partnership we're trying to help them with? And our role is to help bridge that gap between the prescriber of the medication and the patient helping them understand and educating them on why this medication was prescribed in this manner.

And we need to think about the fact that these adherence issues, even though I don't particularly like that word anymore, are some of the reasons that people end up in nursing home, hospitals and even die. Many of the times, I can't say most of the time, many of the times it's because they just didn't understand what the prescription said what the effect of that medication was. So when you're looking at how many medications you're taking, the CDC actually reported that 1/3 of the patients take the medications correctly, 1/3 of the patients take the medications incorrectly and 1/3 of the patients don't even take the medications. So when we're looking at this, we need to think about why.

And sometimes maybe the prescriptions weren't really written well and that's the pharmacist's job to make sure that they understand that this is written according to what that medication typically is written for and question if it is not. But when they talk about 25% of these are never even filled at a pharmacy, we could be a role in that referring them to social services that might help them, helping them find ways and people that organizations that are there to help them get these filled, were they not

filled financially or were they not filled because nobody could get there. And so we really need to look at The Five Dimensions of Adherence. And this came out from the World Health Organization. And what it is, as a physical therapist, we can pretty much look at all of those as their social and economical reasons that we can get referrals or some help in there to help them even take the meds. Is there something in the healthcare system that they didn't even know how to access it to get the help they need. Is it something condition related? That's the adverse reactions related to our functions and our role and then the therapy-related is related to our plan of care but the patient-related again comes back to did they understand what they were supposed to do and how they were supposed to take these.

So if we break these down, availability of transportation, cost , availability of their insurance, those are all social determinants of health. The healthcare system where they even have a pharmacy available. Is it available when they need it? A couple of years ago I went to the emergency room on a Sunday of Labor Day weekend and got discharged with a home medication, couldn't get it filled 'cause nothing was open through the night, wasn't gonna be open till 10 o'clock on Monday 'cause it was Labor Day. Luckily it wasn't life-threatening but is that something in the healthcare system? Yes, we cannot really do anything about it but we can be aware of it and help our patients know. Also the labeling, the pill identification, all of that is a huge issue. So we have condition related factors that we can address.

Can they even open the containers, do they know about the drugs? If they have unpleasant side effects, how are they dealing with it? Have they reported it back to their primary care provider? Some of them don't take medication 'cause they're fearful of being dependent on things. And then the pain issues. Is it too painful to even get up to take the medication. We have all kinds of therapy related factors related to the drug therapy, everything from dosing regime, sizing and the side effects. But there's other things that we can help identify. Can they read, do they understand it? Is there some

cultural norms there, some personal beliefs there? Some personal behaviors and habits that we can identify that might make them buy into the medication regime more accurately. But the consequences with this is the under treatment, relapses, all of the unnecessary hospitalizations that occur and the cost of that non-adherence is continuing to go up, not only for society but for the patient itself. So we can play a role in educating, helping them to understand their drug regime by their prescriptions, making referrals if we need to, getting others to help them. And really helping to reconcile their medication that they were given at the hospital with what they were taking home and getting nursing or the primary care provider involved as needed. But one of the biggest things is these outdated drugs. I don't know how many patients I've gone into home health that they have had outdated drugs and they don't know what to do with them, they don't wanna throw them away, we don't want them to throw away.

So we need to helping to find out what's in our community for how they take them to the police station or the fire stations or what do they have in the community even at local pharmacies that they can bring back expired drugs so they can be properly disposed of. And I tend to talk to my patients a lot about storage for the stability. There are sometimes they put them all on their window in their kitchen where all the sun's coming through and some of those meds cannot be exposed to light. Some meds need to be in the refrigerator but I've seen them sitting out on the counter 'cause they forgot to put them away.

So we need to talk to them about that stability so that what they are buying, they are actually getting appropriate amounts of. So I just wanna ask you this about an elderly patient on a fixed income uses coupons at various pharmacies to have their prescriptions filled. Why is this not a good practice? Anybody have anything they would want to talk about with that? Just think about it and think about and think about how you would respond to this because if I'm going to various pharmacies, does my pharmacist know my whole medical regime? So we have some things that may

promote adverse drug reactions. One pharmacy, somebody has written something... One pharmacy may use one brand of pill for the same generic as somebody else and the patient thinks it's two different drugs so now they're taking a double dose because they didn't realize it was the same drug. So we need to help our patients understand that having one pharmacist can really help them control their medical profile and communicate with their provider a little bit better especially if they've got multiple physicians or primary care providers providing different mediation. So you have a cardiologist, you have an orthopedic that replaced my hip, you have an endocrinologist because I have diabetes, I have a gastrointestinal doctor because of my past blockage in my stomach. If they're all prescribing things, going to one pharmacy can really help reduce that risk of repetitions of medications. So if you're on a home health visit and the patient tells you that they take all their medications with breakfast and, I mean, all their daily medications with breakfast and their twice a day medications at breakfast and supper, what are you gonna tell them? What are you gonna do? I should give you a few minutes to think about it.

So some of you are writing in here. It's very confusing for them to know which ones to take in the morning and the evening so it's easier for them to just take them all at once but some need to be taken with food, some maybe need to be taken on an empty stomach. So we need to give them some education and maybe help them come up with a system that allows them to track what they are doing and what they are not doing so that they can reduce the risk of the adverse drug reactions. So during a review of medications at your home visit with a 75-year-old patient who is one week postop for total knee you discover expired medications. You also discover that the wife could not go out to get the morphine prescription filled due to a snowstorm so she gave him her Celebrex since that's what she used for her RA pain flare-ups. How are you gonna handle this? And I'll say does this make a difference if the man was six foot two and weighed 250 pounds but his wife was only five foot four and weighed 95 pounds? So some of you just going back about educating the patient not to use other

people's medications about why that's risky because of the different body size but also maybe referring them to some social services to get some help on how to get these prescription fills and then maybe contacting that primary care provider and saying what can we do to help them through this 'cause they didn't get their medications filled. And then again, it's talking to them about expired medications and how they can get rid of them. These are all within our PT scope of practice. If you haven't looked at it before, you might wanna check with the Beer's list. It can be accessed, I put a link for that. They do update this regularly but it does give you some criteria for inappropriate medication use in older adults. Depending on how you develop relationships with physicians and the primary care providers and your nursing staff and home health, if they're getting medications from multiple physicians that according to the Beer's list should not be given together, we need to at least have someone recognize that this needs to be reconciled.

So we're gonna move into physiological system specifics and some things related to this. We'll talk a little bit about some aging issues and some of the common medications. This is not to be all inclusive but it is to give you some idea of how a role can change with the different systems. So we're looking at the musculoskeletal systems. Our patients come and only get pain meds, anti inflammatory meds, muscle spasms and even things for bone density with osteoporosis and that osteoporosis risk. When we're looking at some of the analgesic meds, we have the non-narcotic and the narcotic ones. Narcotic are a little bit more expensive than the non-narcotic but they do require prescription.

And so looking at the different ones in here can help us know are they really more onto that narcotic medications. We're looking at the aspirin type drugs that are over-the-counter. They do have that pain relief, mild to moderate. Aspirin is the one that's the anticoagulant and so our role might be thinking about the fact that if they're on a prescription medication such as the Coumadin for reducing coagulation and they

take their aspirin because they were taking that for pain, we've doubled that amount of anticoagulation. And that could end up with some problems. Aspirin too can lead to some other risk especially in the stomach and it has been shown that long term taking of aspirin has been associated, I'm not gonna say lead to but has been associated with a greater prevalence of cataracts. We'll look at the nonsalicylate drugs, the acetaminophen which is brand name of the Tylenol. They don't really have the anti inflammatory properties or the anticoagulant properties that you might see in the aspirin type drugs. But they also don't have the stomach problems. So that might be an alternative if the doctor says they can take an over-the-counter medication for pain if they are on something like Coumadin we can talk to them about this, to have you asked the doctor if you can take some of the acetaminophens versus the aspirin or at least notify the nursing and the physician that that might be something that they need to consider. We have PCAs, the Patient Controlled Analgesics. They are mostly used in acute care but I've seen a couple have come home in home health, not very often, pretty rare but they can self-administer. It does allow that patient control over pain so they come back into having a little more control and that can give them that little psychological edge to be a little bit more comfortable in managing their pain and in moving forward.

But it does require that patient awareness. When we're looking in that, it does allow self administration. They are giving those drugs at lower amounts but more frequently. And so you get a more level amount of the drugs within the blood but they also, by being lower, you're gonna have less of the side effects because those pumps actually limit the amount that they can have. So they really cannot overdose with those PCA pumps. So my question to you is who should activate the PCA pump and how often should those pumps be activated? Most of you that are popping up here are telling me the patient only and that is true. It is the patient only. Don't let a family member activate it. If you go in and they say they haven't used it, you don't activate it, it's patient-controlled. Now, the nurse may come in and talk to them a little bit because

they can administer things but it truly is a patient control. And they can pump it as many times as they want. So if they say, "Hey, the pain is not going away," and say, "Have you used your pump?" And they say, "Yeah, I just used it about five minutes ago." Well, you know you can use it again. You can use it as many times as you want because it's only going to give them a certain amount in a certain amount of time. The more frequent they give it, the less amount it's going to give until it reaches to the end of that timeframe. So if they're supposed to get two CCs every four hours, that's way too little but let's just say that that's what they got. The first time it may give them half of that. The second time it's going to give them 25% of the next CC then it keeps going down until they have it for the two hours then it would start over again.

So they can actually pump these as many times as they want, it's not gonna overdose. It can be done as often as the patient thinks they need it for pain. The nurse, just so that you know on this, the nurse will go in there and if they see that it's been pumping constantly for a timeframe, they will double investigate to see what is going on for pain to see if they need something for pain, breakthrough pain or some other intervention. If they haven't pumped it at all for four hours then they will start thinking about discontinuing it. We get into our NSAIDs, that's your ibuprofen, your Advil and Motrin are over-the-counter, your Aleve is over-the-counter. And there's less likely to upset stomach but they reduce the inflammation, that is what they're for.

But when you reduce inflammation, you're taking the sensory away from those pain fibers and so you end up having the analgesic effect just because you don't have so much fluid pushing on the pain receptors. And so that's how they actually become an analgesic but it really is anti inflammatory. These are just some common over-the-counter NSAIDS, the maximum dose that's allowed daily. So look at that over the counter Advil. Maximum is 1200 mg. If they come as 200 mg in a bottle and these patients are taking three, four at a time which I have heard of, they're hitting that maximum dose pretty darn quick. And so we do need to think about that and helping

our patients understand what's going on. We're looking at the non narcotic combos. These are the ones that have other things along with them and they're just synergistically are impacting the responses. When we start going into those narcotics, they really can give a numbing and a euphoric effect so they feel really good and so they wanna do more but they can also lead to side effects that include the nausea, vomiting, dizziness because they impact the central nervous system, constipation is the most common side effect postsurgical. So we really need to encourage them to get much more fluid and eating those high fiber foods 'cause that will help them go through the system better and increase that activity. But if you're constipated, you don't wanna walk and when you don't wanna walk then it gets worse and the pain gets worse.

So this becomes a scenario that we really do have to work with our patients. They've just had a total hip replacement and it's hard to get out of bed and we're telling them increase your fluid when now they have to go to the bathroom more and they have to get out of the bed more and that hurts more. So it becomes a cycle that we have to really help them to understand the need to get up so we can avoid that constipation. The other thing with the nausea and vomiting is trying to avoid that fatty and spicy food can reduce the nausea and vomiting. And I've lived in 13 places in the United States including down in the south where everything is fried, fried chicken, fried okra, fried french fries, everything is fried and getting them to avoid fatty foods or fried foods can be real challenging.

I also lived in New Orleans with all the spicy foods there and getting them to avoid that. But if we could tell them let's just do it while we get over this acute episode, you can sometimes get buy in for that. And then we have the combo ones that can just add, we have to be aware of the combination of these drugs and how they can add to the complexity of those potential 80 hours. So I'm gonna talk to you about a 60 year old male soccer player, yes they still play soccer at this age and he underwent some knee

surgery. He was prescribed pain medication to be taken two tablets every four hours. By the third hour, he is in extreme pain and unable to tolerate activity. He asks if he can take one tablet every two hours instead of two hours every four hours. What do you need to do? I gave you some thought provoking questions, what do you need to ask him? What would you evaluate? Is this a need for a referral? What is your recommendation? What would you do in this case? Now, it could be any patient but this is one that I came across. Any idea what you would do? Some of the answers that are coming in, people are calling back about have you contacted your doctor, have you referred them back to a pharmacy? Let's think a little bit more. Is there anything else? Some of you are starting to catch onto this. Is there anything else we need to check such as is there signs of infection? Has he been up too much? You're talking about an older male that's still super active.

Do you think he's gonna lay down and let healing take place? Has he been up too much and has that being up too much caused some more swelling and that swelling into pain? Could he try some ice on his knee when he's in between? We need to rule out those other things that could be causing that pain before we jump to it being the medication. And then if it's still not working, we might have to call back to the physician or to the nurse to come into home health if he is or for an outpatient to contacting someone.

But there's other things to evaluate first. So I want you just to think, don't just jump that it's always a medication just because it's a pharmacology course because there are other things, infection, overuse, the hoax scenario there, what is he eating that's may be blocking the medications from working? So a 65 year old female is being seen for back pain. She was given a prescription for pain meds to take two every four hours as needed for pain, prn. She has been reporting a decrease in her pain and questions if she should stop taking the pain medications. What is your response as a PT? So some of the answers that I'm seeing, really, I didn't get you on this one like I get other people

on it. A lot of times I have heard while I can to anything they need to go back to the doctor. Well, prn means as needed for pain. If you go back to the doctor, he's gonna say, do you not know what prn means? So what we can do as a therapist is to talk to them about how are they taking it? What are they doing as far as PT and some of the things we're doing, helping with that pain control? Maybe encouraging them, don't give up the one at bed time 'cause we know you wanna have a good sleep so you can work the next morning. But if you wake up in the morning and you're not having pain, maybe you don't take it. See what happens. A couple of hours later the pain starts coming up on you, starts sneaking up on you, maybe then you take it but then wait four hours and see what happens. If I'm not having pain then, maybe I give it a little bit longer. So we're teaching them how to taper off without causing that all or nothing phenomena.

And encouraging them that the other things we're doing is really helping. So that's within our scope of practice. We're not changing the prescription from the doctor but we're educating them on what does it mean and how to taper off. We get into the anesthetic drugs. These are the ones that are used as nerve blocks, epidural blocks, they might be used as a general body anesthesia, when they go into surgery and the different ways that they are putting them in, block some of the CNS response. So we do have the topicals and those are used for short-term, those are out there all different kinds of them that people may use. We do have the locals, regionals, spinals and epidurals that are given based on nerve blocks.

They might even use these for surgeries, they might be using them just for short pain relief while we follow up with doing exercises and correcting the mechanical movement problem. And the difference between epidural and spinal has to do with dosage, has to do with how many they can give. They can give multiple epidurals at different levels but in the spinal, they're only going to give it at one level. There is some risk. Yes, the spinal cord damage, when they do it, could be a risk but the biggest thing is that if they do these spinals and epidurals for surgery, patients don't have pain and so they don't

understand the need for healing. And I've had several different patients that have had these done for their shoulder repairs, neck surgeries and they like, "Oh yeah, I don't have any pain." So getting them to understand the need for slow recovery to allow healing and not overdo is really important but it can be very challenging as well. We get into the general anesthetics where they're truly taking them into a loss of consciousness and a loss of sensation. These end up with the higher postoperative delirium. They may have some inhaled gases that are used, that are used along with some of the IVs but they are to relax patients so that they can do a surgical procedure, some kind of intubation, something that is going to be much more invasive.

But the post anesthesia effects are really what we need to be aware of. This increased risk for delirium and constipation is really important because these anesthesias decrease the peristalsis which is why a lot of times following a general anesthesia, they're not allowed to leave the hospital until they hear the stomach sounds or until they have a bowel movement but we need to be aware of those postop risk for delirium. The latest guidelines that have come out, the Academy of Geriatric PT was actually involved in reviewing of these guidelines and we're pretty pleased that they actually said early mobility, early mobilization is important to reduce this risk of these post anesthesia effects and it makes sense.

You get moving, you get the GI tract moving so you reduce that risk of constipation, they get it out of their system faster and so we can really play a strong role but we need to be on the lookout for these postop deliriums that we may be seeing even at home health. And then again, the muscle relaxants. So it does affect all skeletal muscles and it's used to treat spasticity but it does affect all muscles when they're taken systemically. So they're often given following muscle tears, muscle injuries. These are just a component of some of the ones that you might come across but they really work by interfering with the transmission of the neuromuscular system, the neuromuscular transmission, you might have neuromuscular blockage that are done

through surgical procedures so that they don't end up moving and jumping on the table, you might have some spasmolytics that are working to relax the muscle pain, muscle spasms and also there's stronger ones that are used in various neurological conditions. We need to be on the lookout for drowsiness, excessive weakness because that leads to fall risk. So anybody that's had a muscle relaxer for pain, a muscle relaxer for muscle spasms or spasticity, that too much relaxation can be a problem, fatigue can be a problem because that's a fall risk. So we definitely need to be on the lookout on this. If they're having the intrathecal baclofen which is antispasmodic that is given through that intrathecal pump, because it's more directly into that blood brain barrier, it can cause some vomiting and headaches and we need to be on the lookout for that. If they are persistent, if there's nausea and vomiting along with it, there could be a malfunction in that pump or tubing.

And with people aging, following cerebral palsy, aging with some of these conditions following some of the military injuries, some of these pumps have been in for 10, 15 years that may even start breaking apart and start showing some of these intrathecal side effect signs. So when we're looking at the role of when we actually those baclofen pumps we have a role, both PTs and OTs, in the placement. That's where we start doing that assessment of the Ashworth Scale for Spasticity where we're looking at what kind of function we want. With the way the baclofen pumps are set up, they can be programmed to give a certain amount each day, a certain amount at different hours during the day.

That might impact the function because some of the activities, they may need a little bit of that spasticity for the tenodesis to be a little bit more functioning and in other times, they may need that reduced. So having this ability to have a programmable pump is really important and how does that impact our role as a function? We can be really playing a good role with our patients to be an advocate for them. We can also be a role in do they need any supplemental injections in specific muscles to improve their

mobility and their movement function. So if you are treating a patient who is injured at work and has low back muscle spasms, he was taking Skelaxin and tells you he always wants to sleep. He is currently still working and having problems staying awake at work. What are you gonna do? Okay, a couple of you got it right. You were really right on track from the very beginning. All of these are good answers that you've got but the ones that we're talking about really first checking to see if he's taking it appropriately by the schedule and when is he taking it? If they told him to take it every six hours, can he alter it a little bit during the day so that he's taking it not first thing in the morning when he's going to work and maybe getting him sleepier. When is he actually taking the meds in relationship to his work day. But then we also need to think about what else is he doing. Is he taking it correctly? What is he doing regarding other types of stretches, other types of activity, to help him at work? What does his job entail? If it entails electrical equipment or some kind of heavy equipment then that might be dangerous. And in all of those cases, we may need to refer back to the primary care provider to say this is not maybe too much for him or if he needs to be taken off work. Now this is not something we'd see in home health but it's something that we'd see if we're an outpatient.

So we have a 55 year old patient with C7 tetraplegia and has increased spasticity in his arms and legs. The neurologist inserted an intrathecal baclofen pump. The patient's lower extremities responded well with the decreased spasticity and he's able to stand and transfer. However, the OT states the upper extremities have too much decreased tone for the patient to be functional. How can this be resolved? So with the programmable baclofen pumps, maybe they need to change the time of day they're getting different things. Ideally it would have been better to have the OT and PT involved early to talk about this with the neurology on the actual level of placement but since it's already placed, going back to that primary care provider and OT and PT having a team meeting about when does the OT need to have a little bit more tone for that tenodesis to be functional, when does the PT need to have a little bit less of the

tone in the lower extremities to allow him to stand and transfer. So that's a case where we get back into that health team conversation of what is function and how they can reprogram the pump to deliver what we need at the time that the patient needs it to be functional. We look at DJDOA, we've got things with pain, inflammation, skin, we go back into those pain and anti inflammatory drugs including some of the cox inhibitors and the corticosteroids, we do need to think about whether they can be tapered off or whether they are for a specific time. Usually the prednisone is one of the corticosteroids that is tapered down and we need to help our patients understand whey they say nine of these first few days then seven and six, what does that mean and why? And then we do need to understand anybody who's taken corticosteroids, they have catabolic to tendons and bones.

So all of the risk for osteoporosis, for tendon rapture, we need to be aware of when we're exercising and developing the exercise program but also if we're gonna do some kind of other supplemental intervention with thonoriano for pain control in a specific area because if steroids are catabolic and if we're adding more into an external delivery method, we make that risk even higher. There's some other medications then that are used with this population. One of the things that has come up more recently is that PTs need to really be cautioning our patients who like those over-the-counter Icy Hots, the different creams for over-the-counter analgesic, make sure that they don't put cold packs or hot packs on them.

Afterwards, skin blistering can occur. And so educating them again that don't do the cold pack on top of the heat. Don't think that that's gonna be better. Don't do the heat pack on top of the topical heat cream. You're gonna cause some dermatological damage. So educating them again is really important for how these things can work together or against each other. Then we get into rheumatoid arthritis and there's so many different things that can be done with the rheumatoid arthritis with it being an autoimmune disease that not only deals with pain but deals with inflammation. The

immunosuppressant drugs are really considered more of the last resort 'cause it suppresses that immune response which then causes more problems for other systems. When we're looking at osteoporosis we have patients who are taking medications for bone density, they are taking medications for estrogen replacements and we need to understand if they're taking these, recognizing some of the side effects. One of the biggest things with osteoporosis is not only does it stimulate some of the new bone growth but when do they take it, what type are they taking? Some of our patients just go get tums or something over-the-counter. They need to check them because we've done some informal just testing of this with students with some clinicians where you just put some of these things in vinegar for 30 minutes and they don't dissolve. If they don't dissolve in 30 minutes, the body is not using them.

So if they have been told that they should just get some of these things over-the-counter or maybe you wanna talk to them about it that this is the one you're gonna use. Just take one and see if it dissolves in 30 minutes. They keep changing them over-the-counter constantly so I can't say for sure that all of these haven't been improved but it is a way to double check it. We wanna make sure they're doing weight bearing exercises, core strengthening versus those trunk flexions. I don't think is anything you guys all don't know.

But the one thing is that some of the osteoporosis drugs, they need to sit up for about 30 minutes after taking them and if they don't, they're gonna have some of that reflux and then they're gonna wanna vomit and they're gonna lose it all. They also need to know that the body can absorb 500 mg at any one time. So if they're taking their calcium tablet with their milk or with their yogurt thinking that they're getting all the calcium they need for the day, the body's only gonna absorb 500 mg at any one time and try to get rid of the others and that's where you start building up with these kidney stones for those that are at risk. So they need to spread them out throughout the day. Again, another area that we can work on with education. We're gonna move in to

neurological conditions quickly, talking about the drugs used for the different diagnosis that we see, how they block the transmitters to alleviate the sypmtoms. We need to think about some of the epilepsy, the seizures. Seizures can occur with anybody that's had a neurological diagnosis, a neurological impact that affects their brain. So we need to know have they had seizures, are they on seizure medication. And then also realize that some of the meds like Topamax that is used for migraines, one of the reasons they started looking at that, they thought the migraines were like a mini seizure but they may be used for some off label use especially for those that have some dependence on alcohol, they might be using some of these Topamax medications.

But we should ask them regarding their seizure history. Anybody that's had a stroke, anybody that's had a TBI, anybody that's had something that's impacted the brain tumor that's been removed. We need to ask them have you had a seizure? Has the doctor talked to you about this? If they do, we need to know a little bit more about the history. How long do they typically last? Do they typically last only five minutes? Do they typically last 10 minutes? That all is gonna help us in determining our response but I always wanna know what do they want me to do as a clinician in the seizure. Who do they want me to contact? When they have a seizure, after they've had a seizure, patients will lose control of bodily functions so they may be embarrassed because they may urinate on themselves and that they don't want a lot of different people to know about that.

But if they have no history of a seizure and a seizure occurs, that's when you have to contact the physician immediately. The rest, they may have some guidelines for when to contact the physician if it's out of the normal for them. So what is your immediate response with a seizure? Hopefully, you all know this but I just wanted to get you to think about this that we wanna stay calm, time the seizure, we don't wanna restrict them from activity, we don't want wanna put anything in their mouth, all that bit about swelling tongue has been all by the wayside. We wanna be with them if they're walking

to keep them from having injury but we don't wanna force them to sit down, force them to lay down. Try to encourage them if we can so that we can keep them from getting hurt. If we can put them in a recovery position on the side so that if they vomit, they don't choke on their own fluids. Always be monitoring their vital signs in case they actually do end up going into a cardiac arrest. But know what your procedures are for you facility, your organization about who you call but also know what that patient wants as well. If you're ever in doubt, that's when you call the ambulance. Just to kind of come between the difference between dementia and Alzheimer's, not all that forget things have Alzheimer's and we need to know the difference between dementia, depression, delerium and a new thing that is occurring in the older adults which is drunkenness.

We need to know the difference. Dementia occurs gradually over time, depression can occur after some kind of an event, delerium can be that postoperative delirium that occurs quickly due to medication, something going on physiologically and drunkenness has its ups and downs. And just so you're aware, there has been some articles coming out that increased alcoholism in aging adults is on the rise. And so we do need to be aware of that. We need to think about the other reasons for dementia. Is it reversible or irreversible? The reversible are things that might be from a brain trauma, from a stroke, from alcoholism.

And then there's other things that mimic the dementia. Urinary tract infections can mimic the dementia especially when they get put on anticholinergics because now you're blocking the acetylcholine that needs to go to the frontal lobe in order to impact executive functioning. Stress, hydration, nutrition, all of these things. So if you have a change in cognition, start evaluating other things besides just saying they have dementia. There are some drugs that are out there for Alzheimer's itself. They cannot really reverse the disease at this time. I did read an article, I think within the last month. I wanna say it's about the last two weeks about hyperbaric oxygen showing some

promising results of reversing Alzheimer's because of the increased oxygen to the area but there's not been a lot out there on how we can reverse it, just that we can delay some of the progression of it. The problem with that is when do you start and when do you stop? It is not considered a standard of care to give any kind of medication for behavior controls. So if we see somebody that's getting a medication, an antidepressant, an antianxiety, something for behavior control instead of working on, if they're getting this behavior control for the dementia, we need to be making somebody aware of that because that is not considered standard care. And that being said, how do we recognize pain in those who have dementia. What do you do to recognize pain with those who have dementia?

Body language, facial expressions, grimacing. All of those same things that we would recognize in a new born baby that cannot talk to us but we find out they're in pain. And there is a dementia scale out there that does follow that. So we need to be looking at behavior and grimacing and facial expressions. Are they trained to move 'cause they gotta get off their buns and get up and moving. We know that physical activity helps slow down dementia and it also helps to eradicate some of the pain that's related to dementia. So we need to think about that. And then there is this whole discussion about when do we help them, when do we make that decision to move out of their own home.

And that is something that is beyond the scope of this session but it's something for us to really think about too. We go into Parkinson's disease. There are so many different things that are happening. I went to a session put on by a neurologist a couple of summers ago who really questioned whether the dementia that is related to Parkinson's is really part of the disease or is it a side effect of the dopamine that is given for the physical function. And when you think about it, dopamine and acetylcholine compete for the same receptors. So if we have some decrease in those receptors and then we have decrease in dopamine being generated to reach those

receptors and now we're given dopamine in order to have the basal ganglia physical symptoms being taken care of but they compete against acetylcholine in the frontal lobe of the brain then it can be considered a side effect and it was really kind of an eyeopening for me to think about that. Is dementia a progression of the disease or a side effect of the drugs? And so one of the questions is when to start the dopamine? When should we see them with the therapy? When they're on their cycle 'cause they have an on off cycle and I think general consensus for this has been that we should actually make our time to see them at both sides. When they're on, we can make some really good progress and function and movement but when they're off we might be able to see how their symptoms are really impacting daily life to help them with their assistive devices.

And the latest research coming out is really we need to get them on high-intensity exercises that are reciprocal, that are moving big muscle groups and are multisensory in order to keep them as functional as possible. So we may wanna do that on their own cycle to keep them really progressing well but then on their off cycle, make some time to see them too so that we can help stay functional in their home. So a 62 year old male has recently been diagnosed with Parkinson's disease. He has started physical therapy last week. He comes to therapy with increased rigidity and tremors. The wife states he got worse after the family reunion at the local park.

Upon further investigation, you discover the patient was stung by a bee and is allergic to bees so uses epinephrine like he has done for his entire life when exposed to bees. Why is this important to know? We have some that are popping up some responses, the interaction of epinephrine with the dopamine. And that, say a drug interaction. So being aware of that, a lot of times people would say, "Oh I'm getting worse, my Parkinson's is progressing," when it's really a short term thing regarding the drug interaction. And if we know that, then we can help educate them on what is going on. And so getting a better idea of what the change, what's happened to the change and

understanding some of these drug interactions can really help us help these patients and their families. We look at MS. There's lots of different drugs used with them and they're used to really treat the symptoms. And we're looking at neuropathies and neuralgias. Again, they treat some of the symptoms of it. And when we go into some of the psychiatric drugs, there's a lot of different diagnosis that are out there that patients may be using these psychiatric drugs for. And just to be aware I've put this in so you might be aware of some of the different drugs. All of these drugs really do have the side effect of dizziness, balance issues, foggy head, so they may have some cognitive changes and these are things we need to be aware of when we're developing our plan of care.

When we're looking at some of these drugs that are given as well, they may have some compliance issues because they don't feel like themselves, they have at different times have different drug holidays which they may be reluctant to do and when we're looking at things with the depression, these antidepressants will really work on the mood and energy levels but now there's been more studies to go back to say if we can get the serotonin in the brain working with more exercise and physical activity, then they can make some changes in the medication profile.

So you're seeing more referrals coming to physical therapy with patients with depression for exercise prescription but we need to be on that alert for that impulsiveness and that nervousness and abnormal dreams that can make them at risk for suicide. We're looking at the bipolar that fluctuate. They are gonna be handled with their psychologist, psychiatrist when they need that extra boost but understanding that they can be very angry and impulsive and then the next minute be crying on you and trying to plan your PT plan of care around this population can be very challenging and working with them on the compliance issues. Part of that has to do with the fact that these drugs usually take a few weeks to see results so a lot of patients don't wanna give it that time. They expect it to happen immediately or on the other end when they

start feeling good, they don't think they need to take it so they stop. So these are the kinds that we really need to get other people involved, our social workers, the psychologists, getting them involved to really know what's going on. If we see patients are fluctuating a whole lot and we're not able to really work on function with them then we need to be referring them back to some of their other care providers or bringing other people in. Okay, so a 75 year old who has been taking anti-hypertension medication lost his wife five years ago. The daughter reported to his doctor that he has had frequent episodes of crying and withdrawal from his social activities. The doctor prescribed an antidepressant. Within two years, he was no longer to care for himself, forgetting his meals, medications and even who the family members were. He moved in with his daughter and the doctor prescribed Aricept for the symptoms of dementia. He fell down the stairs, was taken to the hospital, fractured his femur, referred to PT with touch down weight bearing, was put on postop medications.

He is lethargic on day one and not following commands. During the transfers, he required maximal assist of two, became hypotensive. On day two he was combative and resistive to any movement and the nurses reported he tried to get out of bed. So we have a lot of issues present with him, don't we? This is not a typical patient that we might see. So what are some case management discharge issues? What are some of the issues and what are you gonna do? Definitely over medicated. When he lost his wife and got depressed, could a social worker or some referral have done their helped him get the care he needed. Going through that short term depression, again, this goes back to recognizing depression.

But when he couldn't take care of himself, people immediately started thinking he had dementia and put him on dementia meds. So now he's on all these medications that maybe it was just needing to talk through the loss of his wife. But all of that made him a fall risk and he fell downstairs. So the postop day, he's in postop delirium, he's on some extra medication with pain, some warfarin to keep him from having clots

postoperatively and now as he's coming off of the postop delirium, he's getting that hyper combativeness. So we have a lot of these issues that's overmedication and trying to get some team approach on managing that. But if we're gonna be thinking about discharge issues and he's gonna go back home with his daughter, we have to think about all of those safety issues of the stairs and the managing this as he's coming out of these polypharmacy issues. So these are things we can help recognize to have a team approach. We do the anti-psychotic drugs for drug withdrawal. They use these for all kinds of things, smoking sensation, alcohol. So we see a lot of patients with these kinds of psychotic drugs that we need to be looking at fall risk and what is it happening to function. If we go into cardiac conditions. This is probably one of the most common areas that we see in the geriatric populations. Previous health factors, our physical activity, all of that leads to decline in cardiovascular but cardiovascular dysfunction with aging also mimics those with inactivity.

So now if you combine both of them, you end up with these complications from the cardiovascular dysfunction. So basically the heart becomes less proficient and we can get some thickening in the walls which causes resilience in the walls, which causes more difficult to get in the blood through the walls, so our heart has to pump harder so we end up with the hypertension and high blood pressure 'cause it's pumping harder but the blood's not flowing around due to all the restrictions in the less of the compliancy of the vessels so it becomes a viscous cycle. And in our myocardial infarctions or heart attacks we have the ST elevation MI as well as the non-ST elevation MIs and they're both treated a little differently but they do have the same presentation. And with the management is really to increase the oxygen supply, decrease the work and try to address the risk factors.

So I've put you some categories of medications these people could be on. For the management of the non-ST elevation MI from the ECGs, they're really working on relieving that ischemic pain, and correcting the hemodynamic abnormalities so those

antiplatelets, anticoagulants and they might end up with your different types of surgery. Oops, I'm sorry. They will also manage some of the arrhythmias and the hypertension but they're gonna be looking at risk for future events. So angina, anything above the waist, especially with exertion, that goes away with rest should be considered a form of angina. But in women they can also present with abdominal pain and nausea. So this is the nitroglycerine. The treatment of angina is with that nitrates and they will for short-term quick relief but they will also be treated with the beta blockers and calcium blockers for long-term impacts. When you're looking at the nitrates that is just to relax the muscles. But they can end up with dizziness and headaches and they can also end up with orthostatic hypotension. So that becomes an issue and a risk for falls. So if we have anybody on cardiac medications and that are using nitroglycerine or any other of the cardiac meds, we really need to be monitoring them for orthostatic hypotension and making sure that their vital signs are being managed with everyday activity as well as with exercise or we need to be making referrals. With the beta blockers, it decreases some of the heart rate in the contractions but this can end up causing the respiratory constrictions. So they can end up with a lot of coughing there on beta blockers.

And the calcium channel blockers, that does the vasodilation 'cause it blocks the calcium channels and that can end up resulting in actual relaxation of muscles as well and then your muscles aren't pumping as well so you get peripheral edema because you're not utilizing those muscle pumps to get the return back to the heart. When we start looking at congestive heart failure, when your heart cannot contract strong enough to empty, to get the blood out to the periphery as it needs, you start building up muscle within the heart so now you have less capability in the heart of actually having preload and afterload and it becomes very stiff. It's the most common reason for hospitalization in older adults. So they treat this with the ACE inhibitors, beta-blockers, diuretics and all of the hypertension meds. They used to have exercise for contraindicated people for heart failure. That is not true anymore. So if you were

taught that in PT school, that is not true anymore. They're now talking about moderate intensity, doing short narration so that distributed practice or you exercise you stop, you exercise you stop and your shortness of breath is your limiting factor. You don't want them to get into an anaerobic type exercise so it needs to be paced. So that is a really important component for us to consider with this population. These are some of the common drugs and the categories for those with heart failure. We go into valvular disease of the heart. This is where the valves are not functioning well so it increases that workload, making it less efficient. They usually start off with anticoagulants so that we have all of the risk for extra bleeding, they can end up with stenosis that leads to further cardiac problems. We're looking at hypertension. This has been on the news a lot lately in the last year and a half with what is considered high blood pressure and what is not and there was a big thing about reducing that anybody over a systolic pressure of 125 should be considered high blood pressure but that's gonna happen with normal physiological aging.

And so if we call that high blood pressure, then are they starting medication too early and not addressing the other physical factors. So typically, it is still recommended that high blood pressure is 160 or anything over 160 in systolic and anything over 95 in diastolic. There is this debate about when do you start medical intervention 'cause those medical interventions can lead to the dizziness, depression, syncope, confusion, so do we want those side effects or should we just, we really emphasizing the other components that are needed such as diet and exercise. So it is a stepped care approach when they start looking at medications but the World Health Organization really says lifestyle changes need to go along. And some people say lifestyle changes should be tried first. There's a lot of different kinds of high blood medications that are categorized by their action. So we have the diuretics. It is pretty much the cheapest form but it leads to weakness and fatigue and if you have more fluid going out then what you're bringing in you end up with orthostatic hypotension. So monitoring vital signs becomes a big issue. The beta blockers decreases the force and rate of

contraction but again we can get orthostatic hypotension because we're not getting enough blood to our vital organs. You can also end up with fatigue. So our concerns is all of these blood pressure medications can mask hypoglycemic effects, we need to be on alert for that. They can reduce the time to claudication which is good, they can do a little bit longer exercise but you're gonna need to decrease that maximum exercise capacity and monitor it with the RPE. The rate of perceived exertion is not to be used instead of vital signs but along with vital signs. The blood pressure medications, the beta blockers blunt the response but does not eliminate the response.

So we do need to use both. And then we need to think about the fact that they can have some orthostatic hypotension and if they change to a different beta blocker, we wanna make sure their exercise is staying less than 20 beats per minute over resting because again it blunts the response, doesn't eliminate and we need to know that there's safely an exercise component. There's some vasodilators that decrease peripheral resistance so that the heart doesn't have to work as hard but now we get hypotension because if my peripheral resistance is decreased and I stand up, all the bloods gonna flow to my feet and I'm gonna get dizzy and weak.

And so we need to be thinking about that postural hypotension, the dizziness, the headaches. All of that makes it fall risk and then the edema and fluid retention can cause some impact on joint mobility because if I have too much fluid I can't really exercise. So they work better with longer exercise sections at submax workload and we need to make sure that they understand if they have any kind of medication with them like the nitroglycerines that they have them with them at all times and check the expiration dates. Just a little reminder what orthostatic hypotension is so that we are aware of this and consider having them move their feet before they start getting up. And then the diuretics is trying to get some of the fluid off their system but then they don't want to drink so then they end up with urinary tract infections. And then the loop diuretics along with the thiazides can cause some impact on the anticoagulants and

decrease the effect of insulin. So now we have to be on the lookout for how it's affecting some of their comorbidities. When we're looking at conduction systems and what's happening with the electrical system of the heart and those arrhythmias, these give you some idea of when they have medication treatment versus pace makers versus cardio defibrillators. And then the different types of drugs that are used for them. Think about those side effects. Again, dizziness, headaches. Most of your cardiac, that's the biggest issues. Orthostatic hypotension, dizziness, headaches, at risk for falls. What are we gonna do to do? Mild warmups before we start exercise. How are we monitoring their vital signs during exercise. And then the statins. I think the statins right now, it's as simple to be on statins that end up... I'm on a statin now 'cause I have cholesterol but we need to be looking at diet and they're gonna have some myopathy, muscle cramping, we need to be aware that it's not our exercise that caused it, it's from the statins. A little bit on the hematological drugs, the anticoagulants, antithrombotics. You all know what they are used for and when they are given.

So we need to be aware of open wounds. We need to be careful of any exercise and modality that could cause tissue trauma such as some of our manual therapy and manual stretching. These can also cause some gastric irritation so maybe we don't want them to lay flat. They also can have some back pain, headaches, internal bleeding. All of these would be signs for us to double check, is something going wrong with the antithrombotic medications.

So anticoagulants, we need to be aware of excessive bleeding. These are the drugs that they're on. We all know about coumadin. We wanna help educate them that they should be taken at the same time each day, that's gonna help them have the best effect. The side effects is if they have easy bruising, blood in urine, bleeding gums, coughing up blood if they're sudden. There's something certainly going, we need to be sending them in. These are not something to mess around with. But they may have

some milder problems with it, with constipation, they may also have some decreased motor skills. So these are some side effects to be aware of that not people normally think about with anticoagulants. The antithrombotics are the ones that they give following stroke. Sometimes people with aspirin or people with ischemic stroke are given more doses of aspirin. These just help remind you some of the TPAs that are given following stroke and how they're used in MIs as well. When they get into the ER, they've got to first rule out if it's ischemic stroke or hemorrhagic stroke because that does make a difference. Now the research tells you they should only be given within, they are best if they're given three hours after onset but they're finding out that if they know they are in ischemic stroke, they've even given them later than that and had some good results. Anticlotting rehabs, yes, wound issues, aggressive therapy, watching for rashes. They're in clotting deficiencies.

Then again, internal bleeding, always be aware of those bleeding issues. Their medication may not be working. So if you have a patient that denies any heart problems but you notice a cardiac med on his medication list, how are you gonna do, what are you gonna do? He says, I don't have any heart problem but only had one of those medications. What are you gonna do? So good, we've got some people asking that we wanna know why you're taking this medication. Could it be an off label use for something else. But also we may need to educate that if he's had high blood pressure and this medication is keeping his blood pressure under control, he may think he doesn't have a heart problem anymore.

And so educating him on issues regarding this. I don't think notifying a physician would be in our best interest because he's got it on his list, he's taking it but he just says I don't have heart problems. So he may not really even know what that medication was for or he may think I haven't had any problems so I don't have a heart problem anymore, not understanding the connection. So really the education is a big issue here for him and helping him understand that he had high blood pressure, the medication's

controlling it but the exercise is what we're trying to do in the diet to really help him too and maybe going back to the doctor with a note that is he doing well enough that these medications can start being reduced. A 68 year old was seen by a PT for general strengthening but then he forgot to refill his nitroglycerin tablets. What would you do? Hadn't had any incident of angina. What are you gonna do and then what are you gonna do today? So again, we may need to go back to looking at helping him remember to fill it. Tell him to talk to his pharmacy or social worker about having some autorefills. And then taking it a little bit milder today, watching those response, good, reminding them of the importance of having it, having the medication with him but helping him get a social worker, pharmacy assistance and having automatic refills would be good and then taking it easy today, lowering what we're doing, spending the time more on ADLs maybe, spending the time on education and watching for all of those other signs that we would need. Heading into pulmonary.

Basically the component is restrictive versus obstructive. Restrictive can't get the air in, obstructive can't get the air out. Oxygen is a medication so we cannot increase it without having a prescription for this and we need to know the parameters. So usually they will tell us they can be within, if the O2 sats are within this, we can go up one liter, two liter during activity or we need to think about what else can we implement. So we know pneumonia increases with aging and we need to be aware of those risks with the sleep-wake cycles.

A lot of times pneumonia is not diagnoseD early in older adults because it doesn't present with the same types of signs. It is considered a restrictive disease because they cannot get the air in and can lead to further complications. We have people on asthma that are on medications and they say they have trouble coughing like they can't breathe, they are fish out of water. There is a lot of different medications for them including the steroids again which can cause some catabolic effect on bone and tissues. These are just some components with the inhaled corticosteroids early adding

other drugs as needed. Our concern is they may get quick relief with the corticosteroids but they have some long-term issues that they we need to be aware of. They may also skip doses. We need to understand, are they using spacers. How do they use these? Try to learn about how their inhalers work and are they rinsing after use to prevent infection. There's always these questions, can PTs use the Peak Flow Meter and make recommendations? I would say only if we have parameters from the physicians and only if we understand how those Peak Flow Meters work. And then there is this question of effect of warmup before therapy, keeping it at low dose and watching their response is really an important component. COPD, permanent destruction. Hopefully you all remember all the background to COPD. And when we're looking at this, there is a difference between the chronic bronchitis and the emphysema. These are the medications that are used and most of it because of the steroids we need to be aware of those catabolic effects to soft tissue, bone density, tendon raptures, things like that. And this is just a list of some of those pulmonary mediations and some of the rehab implications.

So you might wanna look at this and think about these rehab implications regarding the sedative, increased impacts of the pain meds they might be on, cardiac side effects, so watching those when we're doing therapy. And then the bronchodilators. When we're looking at that, we need to think about when we are timing our PT. We need to use this as a guide that we don't just do the bronchodilator and then start PT right away. It does take about 15 to 30 minutes to really have an effective use. We also need to be on the watch for overuse. We don't really do a lot with smoking sensation but a lot of our patients are on these and we need to think about those side effects on the cardiovascular systems and the mouth with mouth sores, nervousness, things like that that could affect our plan of care.

So if a patient has been seen by you for treatment of knee pain and canceled his last treatment due to having a cold and today he's sleepy and dizzy and nauseated, some

of the causative factors, I'm gonna kind of give you some ideas on this 'cause we're getting short on time and we may not get through all of the cases today, we might not get through all the systems but I wanted you to have them with cases but the cause of defectives is, did you take an over-the-counter medication? Yes, very important. That over-the-counter med for the cold may have accentuated the mediation for his knee pain because those over-the-counter cold meds also have analgesic in them. So now we've had an additive effect of the analgesic. And that's something then we go into education about, a combination of over-the-counter meds with the pain meds. So a patient with pulmonary fibrosis is on three liters of constant O2 and you are seeing him for Home Health. The wife said that morning during basic grooming he gets short of breath so she'd been increasing the oxygen to five liters till he done and then he turns back to three liters.

So he has pulmonary fibrosis. What are we gonna respond with? First we have to talk about pulmonary fibrosis being a restrictive versus an obstructive disease. Find out what the parameters the doctor has told them they can do. Maybe they need to break up the basic grooming to more less periods in between and be more distributive practice. If he had the obstructive where he can't get it out, the obstructive, they can't get it out, we don't wanna add more oxygen in there that he can't get out then. So this is where education, distributive practice, finding out what the physician has told them and what they will tell us as far as our parameters. I think I am going to stop there because we're coming on to the two hours.

The rest of it talks about urinary and gastro drugs and some things that we can do as well as some cases and some what would you do if. And then I have a little bit on the endocrine system with diabetes and some things with cancer. So we're kind of into these other systems that we've already started talking about, some of the additive effects. And so as we hit on the two hour mark if anybody has any major question, that's fine, otherwise I think they're gonna give you my email as you start going through

the other cases with these other symptoms. If you have questions, I will be more than happy, more than happy to answer emails. So I think I'm gonna turn it back over to our host and ask how I need to give people my email. Looks like they popped it up there for you. So please, as you go through the rest of the systems and think about the cases and what would you do if you have any concerns but hopefully I've given you some guidelines that it is our role to look at medications, what is it doing to our plan of care, recognizing adverse reactions and educating our patients within the prescription that was given. That has been a standard across all states and then you have to be able to look at what does your facility want you to do but you have the tools at the beginning of what our stakeholders have said is within our scope of practice. And I'll be more than happy to answer any questions via email after this is over. So I'm gonna turn it back over to our host.

- [Host] Thank you so much Jill. If anybody has any questions over today's content or quiz questions or whatnot go ahead and place those in the Q&A and we'll answer those here before we close out today. I'm gonna have to replace those up. Jill, somebody wanted us to go over quiz number six. So I'm gonna read that to you if that's all right. For a patient who takes albuterol, when would a therapist schedule therapy sessions to get the most effective outcome of the exercise session? So the answers were 15 to 20 minutes after they take the medication, 60 minutes after they take the medication, immediately post medication, wait two to three hours to allow peak performance.

- [Jill] Okay, so that drug is going to start being effective at about five to 10 minutes after they take it. So anywhere from 15 to 30 minutes after they take it would be when you would wanna start. Doing it immediately, you've already started working on it before the bronchioles start dilating and anything after that it starts reaching its peak at about 30, 45 minutes and then starts changing. So about 15 to 30 minutes. So I think the question was like 15, 20 minutes after they took it.

- [Host] Yes, okay. Let's see here.

- [Jill] As we look through some of these that have been posted, remember that restrictive pulmonary disease is where they can't get the air in because there's so much scar tissue that the lungs are not expanding. And then obstructive is they've got these pockets of the alveoli that have opened up and they can't get the air out because there's so much air in the lungs that it cannot go out through the tubes to exit. So obstructive, they can't get it out, restrictive, they can't get it in. On the one of what drugs to increase sensitivity to respiratory side effects, the beta blockers are one of the biggest ones that increase the effects to respiratory side effects. If they're on beta blockers, it blocks all the beta channels and that's the ones that actually cause relaxation in the bronchioles so if you block that they're gonna be constricted and people are gonna start coughing and then that's gonna lead to other side effects. I'm trying to read through the, some of these are technical issues for it. I don't know what the question is on question 10. Do you have that test up?

- [Host] Yeah, that was the drug class listed shows an increased sensitivity to respiratory side effects. And the answers were sedative hypnotics, antipsychotics, antihypertensives and analgesics.

- [Jill] So it's the antihypertensives.

- [Host] Number nine, during a home health visit, an 80 year old male who is postoperative for a TKA complains of the pain in the hip and groin. He also has lower abdominal pain and tenderness. He exhibits muscle guarding and splinting of the low back. The therapist suspects which of the following conditions are present? GERD, indigestion, constipation or peptic ulcer.

- [Jill] This is the one that I was talking about that the opioids are gonna lead to constipation. So if they're on opioids with following surgery, total knee, total hip and they're starting to complain of hip pain, and back pain. Usually that's a sign of constipation and that's the avenue I go down first because they are probably not getting enough fluid 'cause it hurts too much to get in and out of bed.

- [Host] I believe we have one more, question two. Which of the following scenarios will be classified as polypharmacy for the aging adult. And the possibilities were a patient is taking three to four drugs from various physicians, the physician is prescribing at adult dosage. No one tells the patient to stop taking a drug at discharge or B, the patient is taking medication for which a clear indication does not exist.

- [Jill] So remember the other three of them may get them at risk for polypharmacy but taking a drug for a condition that clearly does not exist is truly a polypharmacy. All the other three that are listed there make them at risk for it but they are not true polypharmacy. And I just saw one in here that says what is the most likely complaint of a patient taking Zocor? Zocor is a statin. And so if you go back to those slides on the statins, we talk about statins, they complain of muscle cramping, they complain of muscle weakness and a lot of times they'll tell you as the therapist that you overdid them, you worked them too hard and they got sore afterwards when it's really the statin drug that caused that issue.

- [Host] And then there's a question on here with prednisone or albuterol most interfere with the wound healing.

- [Jill] Prednisone is a corticosteroid. Corticosteroid is catabolic on soft tissue and bones. So that would be much more interfering than albuterol which is a bronchodilator.

- [Host] That was number five.

- [Jill] I think there was some questions for you about people having trouble accessing the quiz.

- [Host] You can view the quiz ahead of time as far as you can see the questions ahead of time. You cannot take the quiz until the course is over. So yeah. So they can see the questions, you just can't take it until the course is over.

- [Jill] So if anybody has any other questions, again, I'll be happy to answer them via email. And if anybody has any conferences and finds me, I'm always at CSM, usually around the Geriatric or the Neural Section events and I'll be happy to meet you. I love meeting people that I've gotten to do things online with and I get to put faces to names. Reach out and I look forward to meeting people.

- [Host] Well, thank you so much Jill and thank you everyone for attending today. We're gonna go ahead and close out today's course and have a great day everyone.

- [Jill] Thank you all.