

[Please stand by for realtime captions] >> Thank you so much for joining us this session. Before we begin the presentation we want to take a moment to review today's platform. On the right side of your screen you will see our engagement. There are four icons on the bottom that you need to be familiar with to make the most of your virtual experience. First is the Q&A. This is where you will submit questions for the presenters, and you can send them in during any time of the presentation and they will respond. He will also be able to upload questions that your fellow attendees submit. Next we have the poll. Presenters will use multiple choice questions . The third is react. A fun way to let presenters know how they are doing. Last is help. It offers troubleshooting tips should you encounter technological issues. If your screen freezes during get -- press F5 on a PC to refresh your connection . If you continue to have technical issues feel free to submit them under the Q&A tab on the right or email education at ASAM.org . >> This presentation is entitled other classes of drugs. I will pass it over to Dr. Abigail Herron to begin the session .

I have no disclosures to report. Today I will talk to you about other classes of drugs. This is an interesting group. It's different from everything we talk about in the world of addiction, because it comes together with sort of a collection of things that do not fit into bigger categories. Some of the medications are drugs that I talk about here are used as medications. Some have only illicit purposes at this point. Or some are sedatives, stimulant properties, and so this is a diverse group . It's a talk that I like to give because it's an overview of some of the things that we do not think of as often. Because of that I think it is important for you to hear today. It is a lot easier for us to recognize the common substance is, and the ones we see all the time they get so much attention and literature and research. This is a group that has significant impact on patients. And it could be more easily missed if you were not aware to look for zebras instead of horses. [Indiscernible] we will talk about for classes. Hallucinogen ends, dissociative Scott inhalants, and then anabolic or androgenic steroids. >> This is something for you to keep in mind, particularly for those of you that take the exam to talk about the main neurotransmitters that are implicated in the different classes. And so you will see there is overlap where there are certain classes that are properties of something else. But for the most part we will see that the neurotransmitters are dopamine and norepinephrine. The main neurotransmitter sedatives is GABA. The brakes of the nervous system. The main transmitter and hallucinogen is serotonin which also has a huge implication in the world of depression treatments. And then when it comes to the dissociative inhalants the main neurotransmitter NMDA and glutamate . >> So we will start by talking about hallucinogen ends. And then we will do a question to get us started and get you thinking about this class of medications.

LSD and so Sieben are serotonin five H2 A receptor agonist, dopamine transporter reuptake inhibitors, NMDA receptor antagonist, opioid MU receptor agonist, or cathinone derivatives . So go ahead and vote now using the poll. You will have about 15 seconds to go. As a reminder we are talking about the category of hallucinogen ends and asking about the mechanism of action for LSD and civil Sieben. Looking at serotonin, dopamine, NMDA, opioid or cathinone derivatives. I will give you another

five seconds to go. And then we will move on to see the answer. If you picked a . A good job you are paying attention on the previous slide will be talked about serotonin being the main neurotransmitter implicated in hallucinogen use. Let's get into more detail about hallucinogens and how they work , and what kind of effects you can see with hallucinogen use.

>> Hallucinogens are a class of drugs that produce alterations in thought, mood, and perception. They also are notable that they produce minimum autonomic side effects and very little craving. So it's a sensory experience, much more than a physical experience. He also failed to produce any kind of excessive stupor or sensual stimulation. So you are not going to see significant changes in blood pressure, heart rate or in people seeming intoxicated arm. The same might with sedative or alcohol.

>> Some people suggest that a better term for hallucinogens is hallucinogen I am a psychiatrist and for those that are similarly inclined, hallucinations tend to be a perception in the absence of a stimulus, whereas allusions are actually an alteration or enhancement of an existing sensory perception. Hallucination is hearing sounds, where an illusion is misinterpreting a queue. Seeing us and interpreting as something else. They are actually more likely to produce illusion type behaviors. Which may be a more accurate term. >> Interesting reality testing is generally intact, individuals generally able to distinguish the experience that they are having as a result of substance use, rather than believing it to be a real perception. This effect varies greatly with the expectations and environment. And so it is important to get a context of how people are using, and when people consciously seek out to use this but when they use these in parts of spiritual journeys, or religious practice. The setting is very important but to be in a low stimulus environment and environment that feels safe and protected helps people to have a more positive experience. Rather than a more negative experience of hallucination .

I mentioned serotonin is the main neurotransmitter. The classical hallucinogens or referred to as the serotonergic hallucinogens. This works at the five H₂A receptor. Agonist or partial agonist of the receptor, meaning they stimulate the receptor. There are two subclasses . You do not need to worry about this. Unlikely to be tested at this level. But there is a group that are much more serotonin analogues, and a group that are norepinephrine analogues, and the norepinephrine group much more selected for the five HD 2 A. Whereas they find out more of the subtypes the serotonin receptor. >> Also important to note there are members of this class. They are the [Indiscernible] that are not hallucinogen edit. So there are stimulants and in other words for things like ecstasy, or MDMA about are not hallucinogens but go to the same receptor that share chemical properties. >> What do hallucinogens do? You can see altered shapes and color, synesthesia , things like they can taste colors or see music. There also can be alterations in mood which can be positive or negative. Increased anxiety or tension. A distortion of sense of time. We people will either feel no time has passed at all or many hours have gone by when it has only been a few minutes. Difficulty expressing thoughts. Feelings of depersonalization or disconnection. A semi dreamlike or altered state. >> There is not prominent somatic effects but there can be some including dizziness, weakness, tremors, nausea can be very significant with some of these. Drowsiness, paresthesia, and blurred vision. >> Hallucinogen and use his relatively uncommon but

initial use, past year initiatives, people who started using a certain substance for the first time. The national survey of drug use and health, individuals 12 and older. There is actually more new users of hallucinogen ends, it is pointing to stimulants were should be pointing to hallucinogen ends. Then there are of cocaine, heroin, inhalants. So definitely some new use in the adolescent population that can be significant. So now we will talk about some of the different types of hallucinogens in more detail. DMT is the prototype of this subclass of hallucinogens but like in drug discrimination studies, and a lot of research done on hallucinogen ends. This is a naturally occurring substance found in some plants, and also in the secretions from certain kinds of toads. If you have heard of the idea of licking the toad got in order to get the hallucinogen secreted by the skin of the toad. Very rapid on-site, less than five minutes, and a short duration of action. So gone in about 30 minutes. Most commonly used through inhalation, and very rarely injected. You can also taking poorly but it requires MAOI inhibitor in order to be processed in oral route. >> This one is probably the hallucinogen and that has the most reputation and for four use in certain religions, but also for people seeking spiritual journeys, sitting in the woods and doing Ayahuasca retreats. Ayahuasca is a key or a brew that contains DMT and MAOI's and other types of hallucinogen ends . It is legalized for religious use in Native American. But a very specific religion. Otherwise illegal substance in the U. S.. We will talk about psilocybin, another naturally occurring substance found in certain types of mushrooms. Psilocybin for detachment from reality . Inability to discern fantasy from reality. It can lead to panic and psychosis. The reality testing is not intact as it is with some other members of the hallucinogen class. There is a rapid tolerance to effects and force tolerance with LSD. If people use psilocybin with regularity, they become more able to tolerate the effects over time. >> Reports of having mystical experiences and profound sense of inner peace and patience, which is what drives people to use psilocybin. Also there can be negative effects which are predominantly G.I., nausea, vomiting and significant environment desk of vomiting with Ayahuasca as well. As well is anxiety with psilocybin. It lasts a lot longer, for to six hours. If people are having a negative experience they have to sit with it much longer than something with DMT which is only about 30 minutes.

LSD is the most famous hallucinogen. It is a water-soluble, clear white odorless crystals. It can be used in a number of different ways. It can have a blotter paper cover everything paper with LSD is dropped onto and tried. It can also have breath mints, sugar cubes, or thin gelatin squares where it is pressed into pills. It can be smuggled in or sent in under a posted stamp. It's easy to transmit. What I show you in the corner is branding. Different makers of LSD will put different types of figures or colors to market their batch of drug. This has an onset of about 30 to 60 minutes, peak to to four hours, duration eight to 12 hours. Predominantly we have physical sensory effects altered shapes and colors but a heightened sense of hearing. Also depersonalization, visual hallucinations and alterations in mood .

Masculine . The legalization is within the native American church and [Indiscernible]. From this cactus the buttons and the crown of the . [Indiscernible] although sometimes they are used interchangeably as terms

of the drug. It takes about six to 10 buttons for intoxication. A slow onset. About 30 to 60 minutes. The first hour you will see minor changes, some nausea, then over a. About 5 to 10 hours there could be visual illusions and synesthesia. >> DOM is a chemical modification to Mescaline like substances, used as a model hallucinogen and in drug studies. Not widely used recreationally. I mentioned how there were members of this class that did not have hallucinogen effects. MDA is the parent drug that can be modified to make MDMA which is ecstasy or Molly. So this is a substance that has both stimulant and loose a genetic effects but the intersection of the diagram. Somewhat similar to the combined effects of cocaine plus LSD. It can have stimulant effects also get can have some and pathogenic. A sense of connectedness to other people, a sense of understanding. This is sometimes represented and sold as MDMA but different and much about who's the genetic effect MDMA . >> Another diagram for you. Look at the different ones and what happens. You can see there are more hallucinogen like things. The DOM, and then this other side other effects like empathy, MDMA. The center you have MDA which is chemically modified. >> Another one is Salvia. It's a beautiful purple plant growing in the garden right outside the window where I am talking to you right now. It is legalized a plant widely grown. Many may have in your own garden. An herb found in southern Mexico, this America, also it grows very easily in most parts of the U. S.. It can be ingested by chewing, drinking a juice from it. Sometimes it can be smoked. If you remember many years ago a scandal with Miley Cyrus having a reputation seen smoking Salvia that it seemed to be marijuana but she said, do not be upset it's Salvia. It has a variable status currently banned in 29 states. And probably a move to band this federally in the future.

There is a copy of opioid agonist which is the active ingredient that produces the Colusa genetic effects. Salvia is intense and short-lived, under one minute and last and 30 minutes. You see changes in visual perception, feelings of detachment, you can have changes in mood, and sometimes I decreased ability to interact with surroundings. A sense of detachment from reality and even from themselves. >> Just to summarize that we talk about hallucinogen and the good and bad about the talk is the different classes do not relate to each other. So to summarize hallucinogen a clear sensorium contact memory, hyper alert. They are not sedatives. They can show arousal on EEG, intact reality testing, and sometimes they can be reasoned with or calmed by talking. Visual hallucinations are much more prominent compared to auditory. >> There is something that people talk about flashbacks the real name is actually hallucinogen persisting perception disorder. HP PD. This is a reexperiencing of perceptual symptoms that were experienced during intoxication after use has stopped. It's unrelated to dose or number of exposure. And usually resolves within 1 to 2 years of last use. Most common triggers other substance use. A patient who had passed hallucinogen use may now uses marijuana, and it is as though they were using the hallucinogen.

Now let's move onto the next class. Dissociative spirit we will talk about this with the question. PCP and ketamine are serotonin five HT 2 a receptor agonist, dopamine transporter reuptake inhibitors, NMDA receptor antagonists, opioid mu-receptor agonists, or cathinone derivatives ? You will have about Steen seconds to answer this question. Go ahead now. We

are talking about the mechanism of action and neurotransmitter involved in PCP and ketamine. Think about the main neurotransmitters, about PCP and ketamine which are dissociative spirit I will take about five more seconds to answer the question. And then we will show the answer and talk about the logic. >> So PCP and ketamine are NMDA receptor antagonists. This is the unifying feature of the dissociative class, the act by Antigonus at the NMDA receptor. Let's look at that and some more detail. As I said by definition all NMDA receptor antagonists. This is the most complicated of all the substances we will talk about today from the neurotransmitter. Glutamate's is a substance that activates the NMDA receptors and it helps to filter sensory stimuli. When you take a dissociative, there is a noncompetitive lock of the NMDA receptors, so you shut off the ability to alter sensory stimuli, which results in sensory overflow, flooding of the sensory system. Your body responds by disassociation . So rather than stopping which a lot of people think maybe it stops the ability to receive sensory input, but actually floods the system and the response is shutting down and dissociating from big able to process . A little bit more complicated than the other substances. >> A number of significant members of the class. PCP and pet amine as well as dextromethorphan which is widely available as an over-the-counter cough suppressant. And nitrous oxide which obviously has ongoing medical indications which we will talk about more in the inhalant group and a second . The effects are dissociation, sensory isolation, mental distortions, you can see sensory effects but again more predominately sensory and then with physical symptoms. Dissociative use is much more common in men and women, and common in a large urban areas, in combination with alcohol or other illicit substance is. Dissociative use is rampant looking at the lifetime prevalence of drug use. You can CPCP is toward the bottom. With only heroin lower, marijuana at the top. So PCP use in particular is rare. >> PCP developed in an IV anesthetic, for pharmaceutical indication, no longer FDA approved, now is schedule one substance. Because there was an association with the prolonged delirium after its anesthetic use. Also risk of seizure or death from PCP use. Available as a powder, tablets, liquid, and sprayed onto plant leaves and then smoked. It can be taken for installation as well. >> PCP effects vary significantly depending on dose but very dose-dependent. You can go from confusion, delirium, psychotic systems up to, and seizures. It is rare. People do not use it as such high amounts but it can happen. >> This is a great word. PCP is off psycho climatic. And it mimics psychosis. It can include both positive symptoms, delusions and hallucinations, the negatives like blunted affect, and being a social. PCP has one of the coolest bicycle signs which is nice Agnes, a Rotary nice Agnes for intoxication. Hyperreflexia, hypertension, feelings of vulnerability. The person get brought into you in this ER, because they were raging on the street, managed to fight off three police officers. And the treatment is a low stimulus environment, sometimes sedatives until it wears off. >> So ketamine is a substance abuse that he continues to have indication in use for anesthesia, particularly pediatric population. It is FDA approved for general anesthesia in both animals and humans. It's a schedule three. Administered IV or IM and medical setting. Also abused by inhalation, smokable -- oral administration. Less pollen and short acting the PCP when used as a drug of abuse.

Ketamine predominately is analgesic, anesthetic, and it creates a spacey feeling which is a K whole. Amnesia, delirium at higher doses, nice Agnes, you can have long-term negative consequences like dysphoria, memory impairment, apathy and irritability. >> Dextromethorphan is one I want to highlight to you. Many of you probably have it sitting in your house right now. It is the DM and Robitussin DM. It is in NyQuil, also available as a's angle product you can buy dextromethorphan tablets long. As a cough suppressant. And people can abuse them by taking high quantities of the over-the-counter drug sometimes it is called skittles or rowboat tripping. The antitussive dose is less than 120 milligrams daily. In the recommended dose is about 10 to milligrams every four hours. There is a very narrow therapeutic window. I am sorry a very low index of toxicity, about 300 to 800 milligrams you will see dissociative PCP like effects. So it's possible for someone to not have to take it or take an enormous quantity of pills. In order to have a PCP like effect. High risk medication particularly for younger people. They can go to the drugstore to purchase this. Dextromethorphan causes euphoria and hallucinations, increased with dose. It can cause sedation, drowsiness, dizziness, blurred speech, people can appear as though as they are intoxicated with alcohol. Nausea, vomiting, hypertension, diaphoresis, significant surges at properties. It increases seven Tony synthesis and release and reuptake. There have been associated deaths with large doses. About 200 times the recommended dose. >> As a summary for this group, PCP is actually included on most screening panels despite it being relatively rarely used. You need special testing which is a send out for ketamine or DXM. You can see increased serum CPK and urine myoglobin with the use of dissociative spirit rarely see dilated pupils. Something to consider on the differential if you are looking at patients that might be intoxicated to distinguish or opioid withdrawal. You will not see people having pupil validation. Visual hallucinations are pretty were. >> Inhalants. The only group of substances that we classify based on the route of administration. Similar to saying cracked , cocaine, smoked heroin, and nicotine were in a group because they were all things that we smoked. Obviously there are some similarities and also very diverse physical effects that can be produced by the substances in this class. Once again we will start with a question. And you will answer this using the poll function. Many abused inhalants produce intoxication that most closely resembles which of the following? Alcohol, cocaine, cannabis, LSD, heroin. You have about 15 seconds to use your poll function. Remember we are talking about the effects and the intoxication syndrome with inhalants looks most like these substances. Think about your differential and what would be on it if you saw a patient with inhalant use. Inhalants intoxication most similar to alcohol. Let's talk about this in more detail. As I said inhalants are group of chemicals classified by their administration. Breathable chemicals that can be self-administered. This is one of 1 million pictures of things that you have in your house. Many of you , I did not plan this but I can find something within arms reach that can be used as inhalants. They are everywhere, household products, office supplies. Styling products. And so they are very commonly found in homes, schools and work places. Also known as whippets, poppers, half cup Bangkok kick, sniff. I am sure many other names by teenagers. There are some terms you should know about inhalant use. Is a very testable questions. Sniffing is inhaling , open container. Huffing is taking a fabric that is soaked in the substance or sprayed with the substance and

then using it to inhale and then backing is actually spring into the back and concentrating papers and then healing from the back this is someone bagging. >> Inhalant use and one of the big takeaways you should remember, inhalant use is a syndrome of young people. Inhalants are right in the middle in terms of past year initiatives in the 12 and older group. You see people are more likely to have tried inhalants fence sedatives or amphetamine or heroin, less likely than alcohol, cigarettes, marijuana. It's interesting when you look at the age distribution, very much an adolescent syndrome. So the most common use is going to be the 12th to 17 age band with use decreasing as people get older. So that is significant. Inhalant chronic use has some very negative long-term consequences. And there appears to be a phenomenon where most people try it, decide it is not them, and exit use. So you do not really see it persistent for most individuals beyond the adolescent period. So this is a partial list of what chemical is contained in different household products. Like I said, widely available . And it can be found in pretty much every bathroom, cleaning closet, at home and at work. >> Because of that inhalants have a high abuse liability and often not recognized for the abuse liability. So they are free or low-cost, people or teenagers can get them from their home without having to purchase them, or raise any suspicion. Very readily available and very difficult to test for. You have to do specialized testing. And there is a narrow window in which use can be discovered in toxicology testing . Also perceived as low risk I will not poll you on this but many of us have robbers submit or glue as kids. It is a common thing and it does not seem to individuals this could have a negative consequence, or that substance use and Amway. As smoking a joint or drinking beer. So if you work with adolescents, pediatrician or adolescent medicine, or emergency medicine and UC kids , inquired about inhalant use. Individuals might not think about the fact they are doing this is problematic and provide education to patients and parents regarding the consequences of use . >> Inhalants work because they are highly lipophilic and rapidly absorbed through the lungs and cross the blood brain barrier. Because there lipophilic they can accumulate in the brain, liver and fatty tissue of the body, which means they can continue to release for some time after use. Rapid omelette --onset, short duration. They can have synergistic effects, as I said earlier intoxication syndrome looks like alcohol you can see's energy with sedative use. Acutely euphoria, disinhibition, dizziness, slurred speech, ataxia. Also can lead to toxic effects and overdose. So there can be respiratory depression, cardiac arrhythmias, fix it, Cardia arrest and can death Kenneth Kerr.

-- Inhalants are very bad for the body. And they have significant effects on cardiac, pulmonary, skin, G.I., GU, blood, musculoskeletal system, and neurological effects. You can see cerebellar atrophy, delirium, dementia. Also irreversible white matter changes. You can actually see dementia early age and people in their 30s and 40s from widespread inhalant use in their younger years. >> As I mentioned because of the lip pathetic nature, these can experience a prolonged residual effect because the chemicals are stored and fatty tissues, the way you can see spikes with people who have stopped their cannabis use but you can continue to see spikes, particularly weight loss. The fact is being metabolized and you will cease release of inhalants from that restored and fatty tissue. Treatment is difficult for this group. Many of us to do full time

addiction work do not have a lot of experience working with individuals with inhalants because relatively rare and also less likely to seek treatment. Both this group and the next group. Also profound neurological impairments. It is important to assess cognition intake and to continue to assess a patient's cognition throughout the treatment course. These might not be individuals who do well. Also there is no pharmacological treatment approved for inhalant use. So while absence of course is important in this population, they may have long-lasting neurological effects that are result of the use even when they are abstinent. The final group that we are going to talk about today is steroids . I want to make the point again we are not talking about corticosteroids, we are talking about anabolic steroids are antigenic steroids. >> Once again we will start with the question. Get ready to answer the poll. Which of the following is not a side effect of anabolic steroid use in women? Facial hair growth and male pattern baldness, voice steepening, breast atrophy, sub fertility and menstrual disturbances, or weight loss. Which of the following is not a side effect of anabolic steroid use in women? You will have about 10 seconds to go. The answer is weight loss. If you think about it, the point of anabolic steroid use is to build muscle mass . We would expect to see weight gain. Not fatty weight gain but muscle weight gain. >> Let's talk about this group. Anabolic antigenic steroids, AES. Anabolic means skeletal muscle building, androgenic means mask utilizing. These include testosterone, and more than 100 related synthetic substance. They are schedule three as of 1990. There are medical indications. They can be legally prescribed for steroid hormone rescission see, loss of lean muscle mass. Due to things like cancer or AIDS wasting, HIV-positive individuals. >> So this is a real picture of the same guy on the left and the right. So when these are misused they are used to enhance performance, or improve physical appearance. They are taken at 10 to 100 times the intended dose. There is oral administration but often that progresses to IM administration. Steroids again or more commonly used in late adolescence and early adulthood. You can see this is a percentage using 12th-graders and young adults. As for monitoring the future. There are three populations that are most commonly users of abuses of steroids. Athletes, fighting deletes, athletes for performance and hasn't got estates for improved physical appearance, often adolescence. And then we have the fighting Illini, people that lead the mask lies and features, for their job performance or for aggression. Law enforcement, security. Lots of side effects. It can include acne, liver damage, significant hyper cholesterol, -- aggressive and violent behavior, complications of injections. Hypomania or mania, paranoia, extreme irritability, and then with women you see deepening of the voice, facial here, menstrual changes, male pattern baldness, general hyper toy. And then men have the opposite effects. So this particular --[Indiscernible] testicular atrophy, [Indiscernible]. We have some associated syndromes and treatment for you to have in your radar. One is steroid withdrawal associated depression. This is more recent and recently identified syndrome that can occur when people stop using steroids. Wrap in some case reports of people having significant clinical depression, suicide in that period after steroid withdrawal . These can be responsive to SSRI. Also high rates of comorbid STD, especially opioids. This group is different than all of a other substances we talk about as addiction doctors and that there is no direct euphoric effect. And so people do not use steroids for the direct effect on the brain from

the substance. It is instead for the award from the secondary physical appearance. No direct from the brain versus the other substance abuse that we talk about. >> This goes along with a lot of physical injury and high rates of bodybuilding, and they are often her and a lot of co-occurring pain. You can also see body dysmorphic disorder, muscle dysmorphia. Men present as feeling too small and decide to feel bigger, women distortion about feeling to large and want to be thinner. People use steroids also rarely involved in treatment. As I mentioned it is not you for genic with no immediate high. The goal and said his long-term reward associated with the physical changes. Another thing that is her that this is often seen in the early stages as socially acceptable positive. People get a lot of positive feedback from the change in their appearance. You can imagine that the gentleman I showed earlier, when he went from having this beer belly at first, people were like you are working out at the gym doing great. And so that was a lot of positive reinforcement and it's hard for individuals to identify this as negative. It is less common in individuals if you are not working in an addiction setting. You may be more likely to see these patients where they are therefore liver abnormalities, or profound hypercholesterolemia. Some of the other physical consequences often how they crossed into the treatment rater, much less likely to seek direct addiction treatment like someone with alcohol use disorder, or cannabis use disorder. >> That brings us to the end of our diverse group of substances that we talked about today. I thank you for being with me. I encourage you to keep these on your radar. They are much less common then the big ones like --you will see individuals that are using these substances. And if you are careful and mindful you will be able to recognize the use but thank you for being here today. For those taking the exam, I wish you good luck. >>