

**ALASKA STATE LEGISLATURE
JOINT MEETING
HOUSE HEALTH AND SOCIAL SERVICES STANDING COMMITTEE
SENATE HEALTH AND SOCIAL SERVICES STANDING COMMITTEE**

February 13, 2017

1:35 p.m.

MEMBERS PRESENT

HOUSE HEALTH AND SOCIAL SERVICES STANDING COMMITTEE

Representative Ivy Spohnholz, Chair
Representative Sam Kito
Representative Jennifer Johnston

SENATE HEALTH AND SOCIAL SERVICES STANDING COMMITTEE

Senator David Wilson, Chair
Senator Natasha von Imhof, Vice Chair
Senator Cathy Giessel
Senator Peter Micciche
Senator Tom Begich

MEMBERS ABSENT

HOUSE HEALTH AND SOCIAL SERVICES STANDING COMMITTEE

Representative Bryce Edgmon, Vice Chair
Representative Geran Tarr
Representative David Eastman
Representative Colleen Sullivan-Leonard
Representative Matt Claman (alternate)
Representative Dan Saddler (alternate)

SENATE HEALTH AND SOCIAL SERVICES STANDING COMMITTEE

All Members Present

COMMITTEE CALENDAR

PRESENTATION: THE SCIENCE OF OPIOID USE DISORDER

- HEARD

PREVIOUS COMMITTEE ACTION

No previous action to record

WITNESS REGISTER

JOSHUA SONKISS, M.D.
Chief Medical Officer
Anchorage Community Mental Health Services
Anchorage, Alaska

POSITION STATEMENT: Presented a PowerPoint titled "The Science of Opioid Use Disorder."

ACTION NARRATIVE

[1:35:15 PM](#)

CHAIR DAVID WILSON called the joint meeting of the House and Senate Health and Social Services Standing Committees to order at 1:35 p.m. Representatives Spohnholz and Kito and Senators Wilson, Von Imhof, Giessel, Begich, and Micciche were present at the call to order. Representative Johnston arrived as the meeting was in progress.

Presentation: The Science of Opioid Use Disorder

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CHAIR WILSON announced that the only order of business would be a presentation on the Science of Opioid Use Disorder.

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JOSHUA SONKISS, M.D., Chief Medical Officer, Anchorage Community Mental Health Services, presented a PowerPoint titled "The Science of Opioid Use Disorder." He directed attention to slide 3, "Learning Objectives," and moved on to slide 4, "Outline." He shared that he would present a review of addiction in general, then discuss the neuroanatomy of the reward circuit which was important in addiction, and continue with discussion of two models of cognitive impairment in addiction as this was a reason why addiction was so pernicious and difficult to treat. He said that he would discuss research on executive functioning in addiction and lastly he would talk about evidence based treatment for opioid use disorder. He expressed his hope that this information would "help all of you make informed policy decisions around opioid use disorder treatment." Presenting slide 5, "A brief review of addiction," he stated that there was a need for four things to have addiction: tolerance, withdrawal, dependence, "and a little something more." He

addressed slide 6, "Tolerance," and explained that tolerance was the need to take more of a drug to get the same effect. He offered an example of audience tolerance, noting that if his jokes did not become increasingly funny, the audience response would fall off. He declared that with tolerance it was necessary to have more of something in order to get the same response as previously, and that this was the first ingredient of addiction. He addressed slide 7, "What Causes Tolerance?" and explained that the brain makes adjustments so that it functioned normally when the drug was present, and abnormally when it was not. He offered a comparison of heroin to driving with a heavy foot on the brake pedal, noting that it was necessary to push even harder on the gas to get up to speed, or stay awake, or stay breathing, or stay alive. He declared that this was the purpose of tolerance, the body was adapting to the drug. He said that an important mechanism for tolerance was downregulation of receptors. He explained that neurons communicated in the brain, as one cell would send an electrical signal from one end to the other end, but then it would stop, slide 8, "downregulation." He compared a neurotransmitter to a ball crossing a neuron, sending an electrical current to the other end of the neuron. Addressing the three cells on slide 8, he explained that the cells had opioid receptors which needed to be occupied at all times in order to operate as they were supposed. He reported that these opioid receptors could be overwhelmed with morphine, and would not function well, so some of these receptors would be withdrawn. Consequently, if there was morphine readily available, the remaining receptors would be full, but would allow the cell to function in the way it was supposed. In the event that the morphine was suddenly no longer available to the remaining receptors, there would be withdrawal. When the body had developed a tolerance for a substance, its removal resulted in "awful physiological symptoms." He directed attention to slide 10, "Withdrawal," stating that it reflected a clinical opioid withdrawal scale which was used by doctors to objectively measure opioid withdrawal in clinical settings. He stated that, although withdrawal from alcohol could be deadly, with opioids, usually it was not. He declared that there was a pronounced physiological response when the substance of tolerance was removed.

DR. SONKISS pointed to slide 11, "Dependence", and stated that tolerance plus withdrawal resulted in dependence. He addressed slides 12 - 13, "Is dependence the same as addiction?" and shared that, although anyone could become dependent on morphine in a health care emergency, it would take more than dependence to have addiction. He offered some examples of various

medicines that could cause tolerance and withdrawal but were not substances of abuse: clonidine, a blood pressure medicine, and venlafaxine, an antidepressant.

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DR. SONKISS pointed to slide 14, "A little something more" and offered a definition for addiction: a chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences. He emphasized that it was necessary to have the adverse consequences, which could include going to jail or having your children taken away. He mentioned that experts in this field were referencing this as substance use disorder instead of addiction. He reviewed slide 15, "Models of addiction," and shared that there could be some instances, although he hated to admit it, where the Moral model invoked a weak character. He spoke about the criminal model used with the war on drugs. He mentioned the recovery model, which spoke to a personal journey through addiction, and the social model related to trauma and the susceptibility to addiction. He concluded with the medical model, which defined addiction as a disease. He emphasized that these models were perspectives on addiction, were not mutually exclusive, and the scientific basis of the models increased as one moved from the moral model to the medical model.

DR. SONKISS turned to slide 16, "How does addiction get started?" and slide 17, "What sustains addiction?" He stated that, fundamentally, addiction was started with an overdose of dopamine, the fundamental neurotransmitter of pleasure and reward which everyone had. Everything that was good or pleasurable resulted in a burst of dopamine. He reminded the committee of the aforementioned example for tossing a ball across a synapse, with dopamine as the neurotransmitter to communicate between cells. He pointed to examples of eating, with a few dopamine molecules in the synapse, and cocaine, with a massive flood of dopamine. He declared that in every substance use disorder, it was a flood of dopamine that got it started. He stated that, as these memories of the euphoria were quickly ingrained in different parts of the brain, it was necessary for a cell to take down some receptors, as mentioned earlier.

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SENATOR MICCICHE referred to slide 15, and, acknowledging that addiction was a medical condition, asked if addiction was a voluntary disease.

DR. SONKISS replied that the voluntary stage of addiction was a very early stage, though this voluntariness of the disease quickly becomes less and less. He declared that there were other diseases with a voluntary component, describing Type II diabetes as a lifestyle disease, and adding sexually transmitted infections as another example.

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DR. SONKISS returned discussion to slide 17 "What sustains addiction?" He shared that this move away from a voluntary action was conditioning based on memories of that intense pleasure. He explained that much of what we learn had nothing to do with what can be articulated to people, but instead with behaviors that were ingrained and associated with experiences. He directed attention to slide 18, "Think Pavlov, not schoolteachers," explaining that the dog was conditioned to salivate when the light bulb was turned on, no matter what. He pointed out that it was possible to explain to this dog that it was morally wrong, to yell at the dog, to kick the dog, or to electrocute the dog, but once there was conditioning to respond to the light bulb, the dog would salivate. He emphasized how difficult it was to change this learned behavior. Moving on to slide 19, "What sustains addiction?" he explained that the salience of drugs eclipsed other stimuli for an addict, and that drugs were constantly in the foreground and remained the most important. He shared an example from slide 20, and then pointed to slide 21, "Salience in the healthy brain." He pointed out that family was salient, it was very important, and most decisions included some relationship to the well-being of family; whereas, for the healthy brain, drugs and alcohol were in the background.

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DR. SONKISS turned to slide 22, "Salience in the addicted brain." He explained that, for a severe addiction, after a drug gets its grip, the salience of drugs became paramount and eclipsed everything else. He moved on to slides 23 - 25, "The reward circuit," and explained that every addiction, including opioid addiction, moved between these four areas of the brain: the pre frontal cortex (PFC), which was responsible for judgement, thinking, reasoning, and decision making, all of

which allowed a person to hold a position of responsibility; the nucleus accumbens (NAc), which communicated with the PFC and was where there was a feeling of pleasure; the ventral tegmental area (VTA), which was the seat of reward and accomplishment and would send dopamine through the nerve cells to the NAc, "which would then feel awesome," and in turn would tell the PFC to allow this; and finally, the locus coeruleus (LC), which primarily served to keep a person awake, alert, and paying attention. This was important, as the LC was an area for the brakes to be pushed on, addiction to opioids with its escalating use tried to shut down the LC. This, in turn, forced the LC to work harder to stay awake, alert, and alive. He stated that an overdose caused the LC to shut down; whereas, withdrawal resulting from the removal of the drugs, caused a massive norepinephrine rush.

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SENATOR MICCICHE asked if a person with a substance abuse problem had an addiction to opioids or to dopamine distribution.

DR. SONKISS replied that dopamine was the main mediator of addiction, as addiction was a dopamine deficiency. He explained that removal, or down regulating, of the opioid receptors was also the removal of the dopamine receptors. The result was that only the drug of abuse gets a person enough dopamine to get the satisfying rush.

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CHAIR SPOHNHOLZ asked if this process was similar for other addictions.

DR. SONKISS replied that this was essentially the same process for other addictions and many behaviors, such as compulsive gambling. He declared that the neuro circuitry was the same, and the deficit in dopamine was fundamental to all of these substances and behaviors.

CHAIR SPOHNHOLZ declared that it was important to understand this was the same problem with alcohol and other drugs.

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DR. SONKISS stated that there were fundamental differences between different substances of abuse. He listed some key differences, which included the down regulation of receptors, as

the extent for reversal of brain changes was not the same for every person or every substance. He declared that alcohol reversal was easier than that with opioids.

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DR. SONKISS addressed slides 26 - 28, "Biomedical models of addiction." He explained the changed set point, stating that the changes with opioid use were permanent, or semi-permanent, structural and chemical changes that created a new biological and behavioral baseline for the addict. He offered a comparable example to addiction for the difficulty in attempts to lose weight, as there was a set point for body weight to which the body wanted to return. Once there were neuro biological changes, these became hard to reverse, and relapse was common, especially with opioids. He spoke about cognitive deficits, and shared that opioid use degraded prefrontal cortical inhibition of the drive to use, undermining the addict's will at a neurological level. He stated that there was some truth to the idea that an addict lacked some will, and that this degraded prefrontal cortical inhibition of the drive was the reason.

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DR. SONKISS stated that addiction was very pervasive, and that many people with addiction were highly functioning because there could be compensation, although this was more difficult with opioid addiction as the will was undermined and the prefrontal cortex became less effective.

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DR. SONKISS stated that he would break down the cognitive impairment that occurred in addiction into categories, slide 29, "Cognitive deficit model" and slide 30, "Domains of impairment." He spoke about impulsivity, describing those who act before thinking, and the necessity to exercise impulse control. He said that people who use drugs to excess tended to be more impulsive, and then become even more impulsive. He noted that reward hypersensitivity, really wanting something, was the desire for something becoming the most important thing. He stated that harm hyposensitivity was forgetting how bad it was, and that increased risk-taking was the attitude that they would not be found out. He offered an example of outcome myopia, that getting high now was more important than getting a job in a month, because it was now, and that a punishment was less important as it was out in the future.

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DR. SONKISS offered four categories of research which supported the theories, slide 31, "Studies of decision-making." The first category was self-report, which was telling someone how you feel or what you do; the second category, behavioral tasks, were psychological tests; the third category, computational modeling, was taking a computer program to evaluate the psychological tests in more detail; and the final category, neuroimaging. He expanded on self-reporting, stating that it was not known if the responses were honest. He declared that addicts knew they were more impulsive than others, slide 32, "Self-reported impulsiveness in cocaine users," and explained the Barratt Impulsivity Scale graph depicted on the slide as a good measure on self-report.

DR. SONKISS addressed slide 33, "Iowa Gambling Task," and explained that this was one of the most common psychological tests used to measure impulsivity and addiction. He explained that this test used four decks of cards and the participant pulled cards off each deck, the object being to make as much money as possible without going into debt. He reported that the first two decks, A and B, offered big rewards right away, similar to a dopamine rush; however, the returns then diminished very quickly and soon became money losers. He compared the third and fourth decks, C and D, to certificates of deposit, as they paid slow, but steady, returns. He reported that most non-addicts would very quickly recognize the need to just draw from the C and D decks; however, addicts would draw many more cards from the A and B decks. He relayed that this behavior could predict who would do well in a rehabilitation setting.

DR. SONKISS described the graph on slide 34, "IGT and relapse in substance-dependent individuals," which depicted test subjects in a six week residential treatment facility for mixed substance use. He pointed out that the abstinent participants scored much higher than those who relapsed.

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SENATOR BEGICH asked about the dip on the graph, slide 34, in week 3.

DR. SONKISS, in response, explained that data points in any study had random variation in the results, and he attributed the

dip, most likely, to this random variation. He suggested that it was more important to focus on the trend.

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DR. SONKISS moved on to slide 35, "IGT and abstinence in methamphetamine users" and explained the comparison of non-addicts with addicts taking the IGT (Iowa Gambling Test). He pointed out that it was very difficult and took a long time to reverse the brain changes which occurred in addiction. He added that a 30-day rehabilitation program would not return a person even close to where they were prior to addiction.

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SENATOR MICCICHE asked if this addiction affected all decision making.

DR. SONKISS stated that this was a fundamental take home point, the impulsiveness and bad decision making from addiction generalized to the rest of life.

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DR. SONKISS addressed slide 36, "Decision-making in opioid users." He explained that most experts looked at groups of studies which were carefully compared in a weighted average (meta-analysis). He emphasized that all but two of the studies favored the control groups, and not the opiate users, which illustrated that even well designed studies had random variations. He pointed out that the studies which included ex-users of more than three years reflected substantial decision making deficits in opioid users, which underscored the difficulty to reverse the brain changes.

[2:25:12 PM](#)

DR. SONKISS shared slide 37, "Computer modeling of decision-making in cannabis users," and he stated that computer modeling could get into the nuances and break down further the cognitive deficits that gave rise to the test scores. He explained that this graph reflected a consistent difference between users and non-users as users ignored loss magnitude, made decisions that were less consistent with their expectancies, and were more influenced by recent gains.

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DR. SONKISS moved on to slide 38, "Imaging studies," which was the fourth of the aforementioned categories of decision making. He pointed to the composite image of the orbital frontal cortex and the dopamine receptors for cocaine abusers and non-users. This showed that "normal fun does not do it anymore when you are severely addicted to a substance." He added that although this depicted cocaine use, it would be similar for any substance use. He directed attention to slide 39, "Why Can't Addicts Just Quit?" He explained that this was a conceptual slide showing what different brain structures did, noting the increased drive to use and the decreased control in the addicted brain. He added that the saliency and the memory of drugs was enormous in the addicted brain.

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DR. SONKISS spoke about slide 40, "Treatment," and stated that 12-step and peer support groups were not strictly treatment, but were interventions which did help a lot of people. He reported that there were many forms of detoxification, and that psychosocial treatment referred to different intensities of counseling and psychotherapy. Although these were effective for most substance use disorders, they were less effective for opioid use disorder. He referenced medication-assisted treatment, which could include treatment for alcohol abuse. He declared that detoxification was not really a treatment, but was more similar to debridement, the cleaning of a wound to prepare it for an intervention, slide 41, "Detoxification." He stated that it was mostly effective as a bridge to more definitive treatment, and was often a practical and economic step. He reported that detoxification from opioids did not have much impact on the relapse rates. He added that the risk of death by overdose was highest after a month of detoxification of opioids, sharing that he often counseled continuation of use until an addict could enter a methadone program. He declared that, although naloxone was a wonderful drug to reverse respiratory arrest during heroin or opioid overdose, an addict would return to where they started, slide 43, "Naloxone rescue is not treatment."

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DR. SONKISS declared that "Psychosocial Treatment," slide 44, was very effective for many types of addiction, especially for cannabis and alcohol use disorder. He said that it was essential as a component to medication assisted treatment for

opioid use disorder, although many studies reported that outcomes were the same with or without psychosocial counseling. He stated that psychosocial counseling as a stand-alone did not work on most disorder populations.

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DR. SONKISS spoke about slide 45, "Medication Assisted Treatment," reporting that there were buprenorphine and methadone, which replaced the opioids in the addict's brain and normalized the imbalance of receptor densities. He explained that methadone, dosed correctly, should not make the person high and that it occupied the receptor for a long time; whereas, buprenorphine was somewhat safer than methadone as it only opened the receptors part way and made overdose more difficult. He addressed naltrexone, which blocked the receptor so that an addict could not get high.

DR. SONKISS discussed slide 46, "Full Agonist Treatment (ORT)," declaring that methadone was a full agonist with a long life, and was only administered in specially licensed methadone clinics, unless it was only used for pain treatment. He explained that it was more difficult to overdose with buprenorphine and that it could be prescribed in an office setting, although special training was necessary, slide 47, "Partial Agonist Treatment (ORT)." He stated that there was very consistent evidence to support the efficacy of opioid replacement therapy (ORT), as there was better treatment retention, fewer overdose deaths because tolerance was not taken away through detoxification, and less hospitalization with less cost, slide 48, "Advantages of ORT." He acknowledged that there was a potential for abuse and diversion, slide 49, "Disadvantages of ORT." He added that this was a lifelong treatment for many, and there was up to a 95 percent relapse rate within 12 months if taper was attempted. He relayed that many people felt this was only a substitute addiction.

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DR. SONKISS shared slides 50 - 51, "Antagonist Treatment (not ORT)," and declared that this was a long-acting injectable, naltrexone. He stated that it was popular in policy circles, especially for those who favored abstinence, and its advantages included that it blocked the high from opioids. It also avoided the stigma of ORT, as it did not replace one addiction with another because it blocked the receptor which the drug of abuse used to get a person high. He pointed out that it could not be

abused or diverted. He explained the disadvantages: oral naltrexone did not work; retention in treatment was low, only 7 - 8 weeks because, although it blocked the high, it did not remove the craving or make a person feel normal; and, it could interfere with pain treatment. He emphasized that addicts when sober did not feel normal, they only felt normal when they were using. The idea behind ORT was to make an addict feel normal, by normalizing the ratio between the receptors and the opioids.

[2:42:58 PM](#)

DR. SONKISS reported that multiple studies supported the cost-effectiveness of ORT, and that one study of a Medicaid population reported that it had reduced emergency department visits and hospital admissions for those beneficiaries with opioid addiction, compared with other treatments, slides 52 - 53, "Economic Studies." He recapped that addiction was a learning disorder with biological, psychological and social components; that historically, biology had taken a back seat in public policies for managing OUD, even as it had been known for more than 40 years that ORT worked the best; that the science of OUD pointed to biology as a key component in managing the opioid epidemic; most people with OUD could not just quit; and he suggested to manage OUD accordingly, slide 54 "Take-Home Messages."

[2:44:58 PM](#)

REPRESENTATIVE JOHNSTON asked if death was possible from opioid withdrawal.

DR. SONKISS replied that, in general, alcohol withdrawal was far more dangerous and more likely to kill than opioid withdrawal. He added that a host of concurrently existing medical conditions could be exacerbated from opioid withdrawal and could lead to mortality. He offered an example that opioid withdrawal does kill in the corrections population.

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SENATOR VON IMHOF opined that the question now was for what programs and funding mechanism to address this issue. She asked if there had been a scan of existing state programs, whether these programs were working in silos, were they competing for the same funding sources, and were there specific targeted programs which focused on specific populations.

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DR. SONKISS replied that he was not sure if there had been a study of available treatments. He shared that it was very difficult to get people into chemical dependency treatment; specifically, it was very difficult to get people into medication assisted treatment for OUD, as there were long waiting lists, qualification was difficult, and it required special assessment with a fee. He declared that there were many hurdles for patients which looked relatively easy until it was understood how those patients think and behave. He stated that he did not know if there was competition for the same payer sources. He emphasized that abstinence based opioid use programs don't work very well. He reported that rehabilitation programs were a \$35 billion a year industry, and these programs had, at best, a 70 percent relapse rate with an even worse relapse rate for OUD.

[2:49:27 PM](#)

CHAIR WILSON asked about a recommendation for state policies regarding the use of relapse as a consequence.

DR. SONKISS declared that behavioral principles were very difficult to incorporate into policy. He stated that, in general, behavior was much more effectively influenced with rewards than with punishments. He noted that work with addicts was almost always in the context of a bad consequence. He suggested that a reward for abstinence as opposed to punishment for relapse was more likely to be effective, simply based on basic behavioral principles for all behavioral modification. He offered his belief that the opioid use disorder population was very, very resistant to feeling bad about punishment, and would not respond to punishment in the same way as the general population. He reported that the best means to maintain sobriety was with medication assisted treatment, and, instead of waiting for failure after three 30-day rehabilitations, have the person assessed for the severity of the addiction and then start ORT earlier rather than later. He declared that there was a tendency toward fail first policies in the insurance industry and in regulation, pointing out that this was the exact opposite of the way the rest of medicine prescribed.

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SENATOR BEGICH asked if a substantial number of the population already arrived with an inability to be impacted by behavioral health decisions because of issues prior to the addiction.

DR. SONKISS expressed caution for characterizing any population as not being able to respond to a benefit from a treatment, specifically with fetal alcohol spectrum disorders (FASD). He acknowledged that the FASD population struggled with learning from experiences. He declared that it was necessary to start interventions early and to be extremely consistent and patient. He stated that there "was no fast fix."

SENATOR GIESSEL expressed her concern that youth will be more readily exposed to marijuana. She asked if would there be more addiction because of the effect on the youthful brain and was it more impactful at younger ages.

DR. SONKISS replied that the brain was growing up to 13 years of age, at which point the signal to noise ratio was not optimal for optimal adult functioning. At this age, the brain begins to prune neural connections, to disconnect them so emotionality, impulsivity, and other cognitive and behavioral issues rectify themselves. He declared that cannabinoids interfered with the neural pruning process, and that the brains of kids using cannabis did not mature, so that these 13 year old cognitive deficits were carried into adulthood. He strongly encouraged that kids not use it. He stated that no one knows whether it will be a gateway drug.

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CHAIR SPOHNHOLZ asked if medically assisted treatment was the most effective for alcohol. She also asked for an example of a positive reinforcement for someone who was already a part of the criminal justice system.

DR. SONKISS in response, agreed that medication assisted treatment was the cornerstone for opioid use disorder; however, although alcohol use disorder had some medications that helped, they were not effective enough to be the cornerstone. He declared that peer support groups and psycho-social interventions were these cornerstones.

DR. SONKISS offered that a temporary time limited increase in privileges was a good approach to reward. He referenced some studies on stimulant disorders that showed a small monetary reward was also successful.

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SENATOR MICCICHE asked for a reading list to be better versed on opioid use.

DR. SONKISS directed attention to slide 55, "Further reading." He said that correctional populations were more difficult to work with.

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CHAIR WILSON acknowledged the need to make policy using meta-analysis.

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ADJOURNMENT

There being no further business before the committee, the joint meeting of the House and Senate Health and Social Services Standing Committees meeting was adjourned at 3:04 p.m.