Cannabis Health & Safe Advisory Committee
Meeting Minutes
Meeting # 4 – March 6, 2019

1. Attendance

Participant	Organization
Danica Lee (co-chair)	Denver Department of Public Health &Environment
Abby Davidson (co-chair)	Denver Department of Public Health &Environment
Marley Bordovsky	Denver City Attorney's Office
Anshul Bagga	Denver City Attorney's Office
Molly Duplechian	Denver Department of Excise and Licenses
Kevin Gallagher	Colorado Cannabis Manufacturers Association
Dorothy Colagiovanni	Next Frontier Biosciences
Gregory Dooley	Dept. of Environmental and Radiological Health Science, CSU
Helena Yardley	Franklin Biosciences
Jill Ellsworth	Willow Industries
Joe Cantalini	Sage Consulting Solutions
John Adgate	Dept. of Environmental & Occupational Health, Col. School of Pub. Health
Judith Shlay	Denver Public Health
Keith Miller	Dept. of Chemistry and Biochemistry, University of Denver
Laura Davis	Environmental Health and Safety Professional
Linda Klumpers	Tomori Pharmacology
Mark Angerhoefer	Craft 710
Kristi Kelly	Marijuana Industry Group
Andrew Alfred	LivWell Enlightened Health
Kim Stuck	Allay Cannabis Consulting
Seth Wong	TEQ Analytical Laboratories
Scott Hansen	Agricor Laboratories

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2. Agenda

a. Welcome and introductions
b. New food safety and sanitation education resources for businesses
c. DDPHE's upcoming assessment of contaminants in recreational marijuana products
    i. Surveillance methodology
    ii. Epidemiological evaluation of data
    iii. Discussion
d. Microbial investigations
    i. Overview of issue and challenges
    ii. Small group discussions
        1. How is a mold-contaminated building remediated?
        2. What are the most significant occupational health concerns?
        3. Are there available resources for employees regarding occupational health concerns? (CDPHE doc, etc)
    iii. Whole group discussion
e. Public comment

3. Meeting Notes

Item	Discussion
1. Welcome and introductions	• Danica Lee opened the meeting by thanking everyone for coming. She explained that the last meeting was cancelled because there were no new developments to share with the group, and the Denver Department of Public Health and Environment (DDPHE or the Department) wanted to make good use of everyone's time. Danica welcomed the following new members to the Cannabis Health and Safety Advisory Committee (CHSAC): Andrew Alfred, chief scientist for LivWell

	Enlightened Health, is joining the committee as a cultivation representative; and Kimberly Stuck, founder of Allay Consulting is also joining the group. These two new members were original applicants. Elyse Contreras will be taking Mike Van Dyke's place on committee as a representative from the Colorado Department of Public Health and Environment (CDPHE). Finally, DDPHE heard feedback that the committee could benefit from more consumer representation, so members are encouraged to communicate ideas for candidates to DDPHE.
2. New food safety and sanitation education resources for businesses	• After introductions, Shelia Ophaug (DDPHE) presented the new food safety and sanitation education resources provide by the Department. • The guidance document was created because the Department received feedback that there was a need in the industry for more education around food safety and sanitation. DDPHE tried to incorporate the comments from previous CHSAC meetings as well as observations from inspections and investigations. • The guidance document was sent out in an industry bulletin, and it is now posted on the Department's website. Hard copies of the guidance document were also available at the meeting. The Department will be hosting three (3) basic food safety courses for marijuana business operators in 2019. The first part of the course covers food safety practices for operators of marijuana products manufacturers (MIPs), and the second part covers health and sanitation practices for marijuana cultivators (grows) and marijuana stores and centers. The next class is on March 12th (full), additional classes will be provided on June 11th and September 17th. Industry members may RSVP for classes by emailing phicomments@denvergov.org

3. DDPHE's upcoming assessment of contaminants in recreational marijuana products sampling/testing during inspections	• Kara Lavaux (DDPHE) and Laura Podewils (Denver Public Health) presented the Department's upcoming assessment of contaminants in marijuana products. The methodology for the assessment was sent in an email approximately one week prior to the meeting. The Department also provided hard copies of the methodology at the meeting. • Kara explained that the Department initially proposed routine sampling and testing during inspections of marijuana facilities. Several members of the committee suggested that the Department undertake a baseline study prior to implementing routine sampling and testing, and the Department agreed. • Before getting into the methodology, the Department revisited the goals of the assessment: 1) Establish the level of potential pesticide and total yeast and mold contamination in marijuana products at the point of sale to consumers; 2) Evaluate the need, feasibility, and cost of a systematic approach to periodically determine contaminants in end marijuana products; and 3) Inform a growing body of information and research about marijuana. • Kara then covered the key points of the assessment's methodology. First, the Department has decided to narrow the scope of the assessment. The assessment will only look at marijuana plant material including pre-rolls, flower, trim and shake. The Department will work with Denver Public Health (DPH) to ensure that the selection of businesses and samples is random. The Department will also randomly select additional stores to obtain backup samples, if necessary. • Second, the samples will either come from pre-packaged product or bulk flower that is packaged for sale on site. If the

	product is pre-packaged, the sample will be collected in the packaging. If the sample is bulk flower, the facilities will weigh the flower and package it as if it was being sold to a customer. • Third, each sample will undergo testing for total yeast & mold (TYM) and pesticides. The Department will be utilizing standardized data collection procedures to ensure that the same data is collected from all the participating facilities. The Department has conducted a pre-assessment training at one facility. • The Department then addressed non-compliant marijuana products found during the assessment. While the goal of the assessment is to gather information, the Department has consulted with other public health agencies and determined that the general practice is not to abstain from protecting public health if a product is discovered which poses a potential health risk during the course of a study or assessment. Any enforcement action taken would be consistent with how the Department handles contaminated product found during any other investigations or inspections. • Laura Podewils then discussed the metrics which would be measured in the assessment. The Department will first describe the attributes of the chosen facilities such as: how long the business has been operating, how long the business has been in the current location, how many employees the business has, which annual income category the business is in, etc. The goal is to see how the selected businesses represent the larger industry in Denver. Second, the Department will seek to obtain two (2) to three (3) samples of each product from each facility, as well as any information contained on the labels of those

	products. Third, the assessment will report the total number and proportion of products that contain contamination. This will be reported in colony forming units (CFUs) as well as a general pass/fail. • One member suggested that the assessment also gather more information about the facilities from an environmental monitoring standpoint. For example, the assessment could note if the facility was retrofitted, and the Department could gather data on how the sampled product is stored. • Another member questioned whether the employee collecting the samples would be biased if Department employees announced themselves when entering the facility. Laura Podewils explained that the Department would be selecting the samples by randomizing items from recent reports of on-hand inventory. • One member wondered if the Department would be able to correlate sample results to specific businesses. The Department explained that it will be aware of the identify of businesses that provide samples as well as the results of those samples. • One member suggested that standard scientific practice is that the lab testing the samples is "blind." Another member explained that the state laws which require tracking of product would prohibit the laboratory from truly being "blind." • One member explained that the Colorado Department of Agriculture (CDA) removes the samples from the tracking system during pesticide investigations, and the CDA laboratory conducts tests without knowing the name of the facility providing the samples. Another member stated that the Occupational Safety and Health Administration (OSHA) conducts

	workplace audits for educational purposes which are not enforceable. • Laura Podewils explained that the people who are analyzing the data provided by the samples will not know the identities of the facilities who provided specific samples. • One member asked what the Department's threshold would be for enforcement action during the study. The Department explained that it would use the same standards that it uses during inspections and investigations which occur outside of the assessment. • One member suggested that the participating labs should be able to opt-out of providing sample results if they did not want to give informed consent. Another member suggested that the study would not collect any data if all of the selected businesses could opt-out of providing sample results. • Another member also suggested that the Department utilize a third-party company to purchase the product and provide it to the testing laboratory, so that the study is "double-blind." Another member stated that the state's tracking system would prohibit that practice, and one member suggested that the sample provider would not be able to benefit from further education in a double-blind study. • Another member had a concern about compliance with rules promulgated by the Marijuana Enforcement Division (MED). This member suggested that marijuana licensees cannot allow product to leave the store while staying in the state's tracking system unless it is sold to a customer. The member also had concerns about whether a retail marijuana store could send products "back upstream" to a retail marijuana testing facility.

	This member suggested that a research and development license could solve these problems. • The Department clarified that the selected businesses would manifest the product to a state-certified laboratory for the testing. The Department also explained that it had been in consultation with MED when developing the sampling process. • One member questioned how the samples would be stored and transported prior to testing. The Department clarified that samples would be taken via courier to the testing facilities. There would be a very short period between the selection of the samples and the receipt of the samples by the lab (less than 24 hours). • Another member stated that dispensary employees don't have experience in sampling, and he would like DDPHE representatives to oversee the sampling to ensure there is no added contamination during the process. Additionally, this member was concerned about potential connections between certain labs and business which could create bias. • The Department explained that DDPHE representatives will be present during the sampling process, but the goal of the assessment is to identify the contaminants in the product that consumers are purchasing which may be introduced during packaging. Additionally, the Department is aware that some labs may create a potential bias, and if the CHSAC members have any suggestions on lab choices, DDPHE would like to hear them. • One member suggested that the Department could "invoke the state's random sampling protocol" which would allow CDPHE to take split samples of product. Another member also suggested

	that split samples should be collected to allow the business to test their own product. • One member explained that if the assessment uses multiple labs, then each lab should be using the same microbiology method to test the TYM samples. Another member suggested that data packets be collected with sample results so that an independent review could be conducted on the laboratory's testing process. Another member suggested that the Department should collect validation studies for each lab selected. • One member explained that split samples going to different labs would turn the assessment into one of lab variability rather than an assessment of product contamination. • Another member wondered what the next steps would be after the assessment. The Department explained that the assessment would help inform practices and procedures moving forward. • Finally, one member questioned the efficacy of the current TYM standards located in MED rule.
4. Microbial investigations	• Next, Richard Pruckler (DDPHE) and Abby Davidson gave a presentation about some of the Department's microbial investigations. • The Department explained that, during these investigations, DDPHE is checking for various contaminants including pesticides, microbials (including TYM), mycotoxins and pest infestations. • An investigation generally begins with a complaint. The Department receives complaints from partner agencies or directly from the public. Complaints about an illness related to a

	product are prioritized. If the Department receives a complaint about a facility outside of Denver, it will refer that complaint to the appropriate regulatory agencies. DDPHE investigators do not know the level of contamination at a facility until they receive test results back from a laboratory. • Since 2016, the Department has received fewer pesticide complaints at marijuana facilities. However, TYM complaints have been steadily increasing since that time. • For example, in 2017, of the fourteen (14) pesticide cases that the Department received, ten (10) cases had a failing test result. In 2018, of the fourteen (14) pesticide cases that the Department received, four (4) had failing test results. In 2019, all three (3) pesticide cases received have passed testing. However, of the three (3) TYM cases that the Department received in 2017, all three (3) failed. Of the eleven (11) TYM cases received in 2018, all eleven (11) failed. Of the three (3) TYM cases received this year, two (2) have failed. • The Department gave examples from specific cases. In December of 2018, the Department received a complaint from a customer who stated that the product they purchased looked and smelled moldy. The Department identified a cultivation facility which supplied the retail location and collected ten (10) samples from the grow. One of the samples had nearly ten million CFUs, another had 1.5 million, another had 1.6, and the sample with the lowest had 14,000 CFUs. The facility was very wet due to a leaky roof and lack of air filtration. The Department sent the samples out for speciation and the business hired an industrial hygienist. The facility is working on

	fixing the roof, has installed air scrubbers, and is treating its product with ozone. • One member inquired about the speciation results. The Department did not have specifics, but Abby Davidson explained that some of the molds found on the product could create aflatoxins and mycotoxins. Mold was found all over the facility not just on product. • In February 2019, the Department conducted another investigation. This investigation began with a complaint from an employee who was concerned about worker safety issues. The MED accompanied DDPHE on the inspection. During the inspection, the Department took samples from marijuana product that was curing and product that was being sold to consumers. Some of the samples tested at 500,000 CFUs. This may be because the lab stopped quantification after 500,000 CFUs. • One member asked if the Department observed any correlation between TYM results and specific strains. The Department said that it had not, but some retailers have eliminated certain strains based on this suspicion. • The next case was also in February 2019. This complainant claimed adverse health effects from marijuana purchased at a regulated facility. Symptoms included a cough, headache, fever, chills, and post-nasal drip. The symptoms did not manifest when the complainant stopped consuming the marijuana, but they reappeared when the complainant again used the marijuana in question. The Department's investigation did not result in any samples failing TYM tests.

	• After the presentation, CHSAC members broke into groups to discuss the following questions:
	  • Question 1: What is known about the health impact of ingesting or inhaling mold contaminated marijuana?
	  • Question 2: Currently, MED rule allows for remediation for mold contaminated plant material. What are the trends relating to mycotoxin formation and are you aware of advancements in other states around this issue?
	  • Question 3: What practices/measures are important to take to remediate a mold-contaminated room? A building?
	  • Question 4: What are the most significant occupational health concerns tied to marijuana operations? Cultivations, manufacturers and retailers?
	• Group 1: This group stated that there were knowns and unknowns related to the health impacts about inhaling mold-contaminated marijuana. First, we know that some people who ingest marijuana may be immunocompromised. Second, studies show that ingesting mold may have adverse health effects and even death in some instances. Third, the group felt that it was important to understand that the health effects of mold and mycotoxins may be different. Finally, little is known about the long-term and short-term effects of ingesting contaminated marijuana and how variables like heat may affect pathways of exposure.
	• Group 2: This group explained that mycotoxins are usually found in products like corn, wheat, peanuts, and hops; however, mycotoxins in marijuana are a relatively new discovery. In the brewing industry, mycotoxins are not normally present in the beer because the manufacturing process contains

	a "kill step." The group also noted that the presence of mold alone does not necessarily mean that mycotoxins are present. Other states such as California, Nevada, and Hawaii are testing for aspergillus species that create mycotoxin metabolites. The group questions whether Colorado regulations will require mold speciation in the future. • Group 3: This group stated that environmental remediation should begin with a baseline test or assessment. Then, if an issue is identified, general sanitation guidelines should be followed. All equipment should be removed from any room where sanitization is occurring until the process is complete. Then, the facility should engage in ongoing sanitation between grow cycles, or other periodic cleaning. Facilities may also use mold resistant paints and sealants. Guidance should be taken from good manufacturing practice standards (GMP), good agricultural practice standards (GAP), and other food handling processes with an emphasis on cross-contamination. One member also noted that the American Society for Testing and Materials (ASTM) published standards in the fall about cleaning marijuana cultivation facilities. • Group 4: This group identified the following health hazards: Use of gas in confined spaces; dermal exposure to plants and product; ergonomic issues; use of cryogenic materials in manufacturing; handling of solvents and material storage; cleaning procedures, humidifier use, and equipment maintenance logs; and eye protection from lighting. The Department asked the group when a N95 mask would be recommended in a cultivation facility. One member suggested that the mask would be used when there is particulate accumulation, for example, in a trim room. Furthermore,

	personal protective equipment (PPE) should be worn during pesticide application. The PPE will be related to the label of the product that you are using, and facilities should ensure that signage is clearly visible when pesticides are being applied.

Public Comment	
Item	**Discussion**
Public Comment	• Steven Cobb (Marijuana business representative) stated that he is looking forward to more information about total yeast and mold in shake and trim. Mr. Cobb said that he was concerned about the assessment's choice to begin sampling at retail marijuana stores because many cultivation facilities will send less contaminated product to stores while the more contaminated product may go to MIP facilities. • Melinda Katie (Citizen) wondered how the Department would determine the cause of contamination if a product at a retail marijuana store tests positive for contamination. The Department explained that finding the source of contamination for any given product changes depending on the investigation.