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*Jeffrey C. Raber, Ph.D., CEO & CVO*

February 25, 2015

Pennsylvania Senate State Government Committee  
PA State Capitol, N. 3<sup>rd</sup> Street  
Harrisburg, PA 17120

Re: Public Comment Regarding SB3 – Medical Cannabis Act

Dear Senate Committee Members:

Thank you for the opportunity to provide comment on Senate Bill 3, the Medical Cannabis Act. I originally hail from Pennsylvania, specifically Lebanon County, and am excited about seeing my home state provide safe access to medical cannabis as I know many people will benefit from having this tool in their medicinal arsenal. As we can start to move past whether or not cannabis should be available to patients in need and more towards how it should be offered, we're faced with numerous questions and complexities that are not often well understood. I hope my comments and insights will help you further your understanding of the science of cannabis and its many complexities so that you make well-informed decisions as you progress down the path of formalizing and adopting the Medical Cannabis Act.

As a brief summary I hold a B.S. in biochemistry from Lebanon Valley College and a Ph.D. in organic chemistry from the University of Southern California. In 2010 my brother and I founded The Werc Shop. We are a science first company offering analytical and product development services to the cannabis and broader botanical based industries. Over the last five years we've serviced the California cannabis market and have also operated in the Washington market for almost a year now. Our organization has ten scientists, six with advanced degrees in chemistry, including a Dutch national with over ten years of cannabis related experience most of which was accumulated in the Dutch national medical program. Our breadth of experience, coupled to a deep and detailed scientific understanding of cannabis and the molecular complexities present within the plant and its derivative products, uniquely positions us to provide informed insights and perspectives on the legal and regulatory frameworks available to states and governmental agencies as they look to implement new cannabis laws and regulations in their locales.

Cannabis in a molecular sense is quite complex as over 500 different chemicals have been found to be present in this plant. A large number of these chemicals have been shown to provide some sort of physiological activity. The effectiveness of whole-plant cannabis is that all of these different chemicals are offered to the body at once allowing the body to impart a better ability to regulate itself with the molecular agents it needs while excreting or storing those that are not needed for physiological regulation at the current time. The chemicals present within cannabis have all been found to have an excellent safety versus efficacy profile, meaning large amounts of them can be taken without causing significant harm to the human body. Small amounts of the agents are quite effective offering an exceptionally safe approach to positively impacting the physiology of the consumer. Compare this to opioids where too much being consumed can shut down the heart and lungs potentially causing death. This inherent safety profile makes cannabis an excellent first line choice for a large variety of medical treatments and an excellent adjunct therapy to help mitigate potential side-effects of other pharmaceutical agents. The molecules present in cannabis impact the body's

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endocannabinoid system. Only being discovered by biologists in the early 1990s the endocannabinoid system, a network of numerous receptors and individual molecules that interact with those receptors, now known to regulate a number of critical body functions such as mood, appetite, sleep, inflammation as well as cellular signaling and cell growth. That lends for modulation of the endocannabinoid system to be effective as a treatment for ailments such as anxiety, insomnia, epilepsy, gastrointestinal disorders and even cancer to name just a few. Most of us have probably heard of the large list of ailments that have been purported to be positively impacted by the use of cannabis. The question for lawmakers is how to enable access to those who could benefit without opening the potential for abuse of the system by non-medical needs. It is not in the best interest of helping patients to limit the ailments that can be treated by a doctor with the use of cannabis. That choice should be between the physician and the patient. Medical understandings, the scientific foundation behind those informed positions, and general knowledge of the effectiveness of cannabis to treat numerous physiological conditions is constantly evolving at a rapid pace. Establishing restrictive laws that could take considerable time and effort to change is not in the best interest of public policy. A structure that enables access in a broad sense under careful guidance by medical professionals, perhaps with a medical commission that oversees those uses and monitors the system for potential abuse, is the best option in terms of a law. Regulatory controls can then be used to limit abuse potential with stiff penalties for those who are found to be bad players only seeking to operate outside of the spirit and intent of the law. Since we have a relatively young understanding of how effective cannabis can be for some people, along with a good amount of data pertaining to the exceptionally safe nature surrounding the use of this plant in humans, it is in the best interest of helping ailing patients to provide a broad and closely monitored system of access instead of a very restrictive and narrow based version.

Another aspect of cannabis regulation that requires serious consideration is which forms of final products should be made available to patients? As there are many different people accessing this medication, all with different personal needs and preferences, coupled to a myriad of potential uses for a wide breadth of indications, the only rational choice is to allow broad based access and let the needs of the patients dictate the end products based on their demands. There are numerous means of utilization of the raw plant material along with a tremendous host of derivative products that can be formed from the use of extracts created from the plant material. Some of the product types are listed below.

Raw plant material:

Direct ingestion – juicing, in capsules, as tea

Combustion – standardized rolled cigarettes

Vaporization – hand-held to desktop units like the Volcano®

Extracts:

Direct oral ingestion

Direct topical application

Vaporization

Derivative products:

Tinctures, capsules, tablets, ointments, creams, infused edible products for oral and sublingual applications, suppositories, transdermal patches, lozenges and dry powder inhalers

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Ingestion of raw cannabis products allows for consumption of cannabinoid acids, non-psychoactive components that are just now being understood to provide excellent anti-inflammatory agents. Inhalation methods, particularly vaporization, allows for rapid relief and careful self-titration ability. Topical delivery methods present the active ingredients at the site of interest minimizing the amount of active agent required to deliver the desired physiological effect. Sublingual delivery, via a lozenge, tincture or other dissolvable vehicle provides direct delivery to the bloodstream without first pass liver metabolism and potential lack of absorptivity. Oral ingestion allows for longer duration of activity.

All of the above mentioned systems may be effective for some patients. An individual patient may even find that multiple methods of use are most effective for them throughout the day. It is entirely possible that a patient benefits tremendously from inhalation in the morning, sublingual delivery during the day, and an oral ingestion at night before bedtime. All of those products may also contain drastically different and quite complex molecular compositions, possibly being completely non-psychoactive, and all being derived from only cannabis components. That's the amazing utility of cannabis as a medicine.

The number of possible product types and delivery options that can be effective to patients is simply too numerous to list here in their entirety. What is important to understand is that any restriction to these methods or types of cannabis products that can be offered would potentially eliminate a patient from receiving benefits from this medicine. That simply can't be the goal of the legislature nor the will of the people. Any limitation or restriction of product types and forms will only open up black market opportunities while potentially harming patients who need access to this medication. Any possible restrictions in terms of labeling, product content limits and packaging requirements should be handled at a regulatory level, not in the law, so that changes and regulatory discretion enable rapid adaptations to ultimately create the best possible working system to benefit the patients in need while thwarting access to those seeking to abuse the system. Cannabis is used to balance physiological functions and mitigate unwanted biological actions. Lawmakers and state regulators need to work together to act like an endocannabinoid system so that they too can find the proper balance of allowing safe access in the broadest possible fashions while mitigating all potential for abuse. While it isn't a simple task it is one that can be accomplished and our organization is happy to help provide additional information or insights to anyone seeking to find this proper balance for their constituents at any time needed. I truly hope to see Pennsylvania implement an excellent broad based law combined with a great regulatory structure that enables diverse access to cannabis in many medicinal forms.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeffrey Raber', is positioned below the word 'Sincerely,'.

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