Impairment Marijuana: Measures of Performance

Dr. Denise A. Valenti
CEO/President
IMMAD

Problem

Currently there are no means to test at roadside or in a work environment fitness to perform with the consumption of marijuana. The rate of fatal crashes has doubled in those states with legal adult use of recreational marijuana. The state of Washington is reporting that those drivers testing positive for active marijuana alone, no other drugs or alcohol, are five times more likely to kill someone other than themselves compared to a driver testing positive for alcohol alone.

We hypothesize that those drivers having harmed innocent pedestrians, bicyclists, passengers or other drivers may not have seen the person, vehicle, stop sign or traffic signal. Our tablet app technology IMMAD-Impairment Measurement Marijuana and Driving is test of the mid peripheral visual system. The Journal of the American Medical Association recently reported that marijuana causes dysfunction in the eye's retinal ganglion cells. IMMAD uses a five-degree striped squares flashed one at a time in the central forty degrees of vision. The stripes are alternating at 20Hz, have low spatial frequency and variable contrast. The driver responds by tapping the screen if they see the stripes. A driver recently having used marijuana cannot see many of the stripes.

IMMAD as a threshold test that identifies and quantifies the retinal dysfunction caused by marijuana use; is a quick, sensitive, objective test of impairment to drive for law enforcement to use roadside. We have a very short version of IMMAD that does not quantify dysfunction but simply identifies impairment for use in other industries.

Idea

We need to bring together partnerships between professionals in the judicial system, law enforcement and science. A test demonstrating impairment to drive with marijuana use is already desperately needed. The harm on the roads with increased death due to marijuana impaired driving is already a public health concern. Technology and tools that enable law enforcement and the judicial system to remove the harmful drivers from the road are needed. It is to everyone's interest, locally and nationally to solve the marijuana impaired driving concern.

In order for a test of marijuana functional impairment to be effective and adopted by law enforcement the test has to provide evidence in a courtroom that facilitates convictions for driving under the influence. Any test of marijuana related driving impairment needs to have the science behind it that will allow acceptance as evidence at a Daubert/Frye/Kelly level. A Daubert level takes a more scientific approach to expertise and acceptance of technology and it is at the discretion of a judge how in-depth and comprehensive the science may be required to be. Standards for vision dysfunction and impairment of peripheral vision have been historically accepted and there is also a large body of scientific literature to support that tunneling of vision and constricted visual fields are a significant impairment to drive regardless of the cause. The acceptance at a Daubert level for either a biologic or functional test would require comprehensive research studies to prove impairment to drive in a court of law.

Resource Requirements

In order to move the science behind IMMAD to the Duabert/Frye/Kelly level we will need to undertake the studies to prove IMMAD efficacy and demonstrate sensitivity as well as specificity. To achieve this, we will need to evaluate the parameters of IMMAD on a group of individuals that have been dosed on real world marijuana (not research grade as the percentage of THC is very low). To achieve this, we have the following objectives:

Objective One: To develop a tablet application, the prototype of a system with multiple-five-degree sized targets flashed one at a time, within the central forty degrees of visual field, of fixed temporal frequency, fixed spatial frequency, fixed working distance of twelve inches, but variable contrast. We will be narrowing the range of contrast to be incorporated into the prototype of IMMAD in objective one. IMMAD will be a threshold test. We will be measuring biologics; blood and saliva in Objectives One, Two, Three and Four.

Objective Two: We will be further refining the spatial frequency of the signal.

Objective Three: To use the tablet system as developed in Objective One and Two but using a chromatic version of the test. The stripes will be blue and yellow rather than black and white.

Objective Four: IMMAD will be tested in participants who will also have been evaluated under simulated driving, Standard Field Sobriety Test (SFST) and have had sampling of biologics, blood and saliva.

Ideal Partners

Once the efficacy, sensitivity and specificity of IMMAD has been demonstrated, IMMAD will be need to be tested in the field as a roadside test for law enforcement. In order to achieve this, we would need to have partnered with a city, town, county, tribal nation or state police force. Such a collaborative effort will require a tremendous amount of planning, coordination, cooperation and trust.

The short version, RRIPT will also require field testing. However, the implementation of RRIPT into a system such as public transit, maritime, aviation or manufacturing will be less cumbersome but will still require considerable planning.

Significant Social Impact

IMMAD and RRIPT are truly innovative. There are no tests of function available. The technologies are objective and quick. Both will contribute to public safety and potential help save lives. We foresee IMMAD being used by law enforcement departments across the country. IMMAD will not be used instead of biologics such as blood, saliva or breath, but in addition to these tests (as they are developed). IMMAD will be an effect tool that will be accepted at a Daubert/Frye/Kelly level of evidence in a courtroom. IMMAD will be a key aspect of the evidence to support convictions for driving under the influence of marijuana. Such convictions will help remove irresponsible drivers from the road. The use of RRIPT in other industries will further enable employers to keep customers and other employees safer.