[MUSIC PLAYING]

SCOTT MALONE: Welcome. My name is Scott Malone. I'm an Editor in Charge of general news for the Northeastern United States for Reuters and I'll be your moderator today. This event is a collaboration of The Forum here at the Harvard School of Public Health as well as Reuters News. Today's program, Legalizing Marijuana, The Public Health Pros and Cons, will last about an hour. We'll begin with an examination of the dimensions of the debate and then look at some of the policy implications.

We'll take questions from our online and studio audiences and also be rolling a brief clip from Reuters News. If you're watching online and you have questions for the panelists, you can email them to theforum@hsph.harvard.edu or tweet them to @forumHSPH using the hashtag #marijuanahealthforum, all one word. You can also participate in a live chat that's happening right now on the forum's website.

And I'll begin by introducing our panelists today, who we're starting from my immediate right are Jim Doyle, the former governor and former Attorney General of the state of Wisconsin. A. Eden Evins, director of the Massachusetts General Hospital Center for Addiction Medicine. Jeffrey Miron, Senior Lecturer and Director of Undergraduate Studies in the Department of Economics at Harvard University who's also affiliated with the Cato Institute.

And joining us online remotely is J. Skyler McKinley, Deputy Director of Marijuana Coordination for the State of Colorado as well as Igor Grant, Chair of the Department of Psychiatry at the University of California San Diego School of Medicine.

Marijuana policies in the United States have changed quite rapidly in the past few years. And while under federal law it remains illegal across the country, citizens face a patchwork of laws varying from state to state and even city to city. We have states, 21 of them, including Hawaii and Delaware that have legalized medical

marijuana. We have another group of states, 15 in all, that have decriminalized it, meaning that possessing marijuana remains illegal, but it's treated more as a traffic offense payable by a ticket rather than prison time.

We have two states, Colorado and Washington state, that had legalized recreational use of the drug. And we have two other states and the District of Columbia that have ballot initiatives this fall considering legalizing recreational use, as well. And with that, I'll kick it off to Jim Doyle to get us started.

JIM DOYLE: Well, thank you. And I'm really pleased to be here. I was a District Attorney, the local prosecutor, in the late '70s and early '80s in Madison, Wisconsin. So these debates have been going on a long time. And the hot issue in a university town like Madison was, do you prosecute marijuana. And my conclusion was we were not going to prosecute simple possession of marijuana. It was a prosecutorial decision, frankly somewhat of a political decision, because if Madison if you were going to prosecute marijuana, you probably wouldn't be the elected District Attorney for very long.

So the debate the debate has been going on a long time. I went on to become Attorney General and in charge of the basic drug enforcement mechanisms of the state of Wisconsin and then governor where I had to deal with issues on a very broad scale. Turning first to medical marijuana, we will hear from experts and research, but to me this is somewhat a pretty simple story.

I have had dear friends, two in particular, suffering from cancer. One unfortunately died from pancreatic cancer. And he had to go out into the street-- he would tell me these stories, he would stay part of the time in Florida-- and he'd go on to the streets of Miami and meet drug dealers and buy marijuana because that's the only way he could sleep at night and the only way he could have an appetite.

To me there's basically wrong. A dying person having to act like a drug dealer, somebody who's obeyed the laws of a life this whole time and now is in a position of having to do this. So it just seems to me on that level we ought to be able to find a way. I know there are a lot of issues in how you design this system and how it works and how it operates and how you keep it away from kids, but we ought to do

everything we can, I think, to be able to have people who find themselves in that situation not have to become criminals at the end of their life making drug deals in malls in Florida in order to get a good night's sleep.

So as governor it never came to my desk because I think politically this issue still in a great deal of flux. There were years when I was Attorney General you could never have said you were for legalization of marijuana politically. Now I think that's changing very dramatically. Obviously in some states it's changing. But I do think we need to do something about medical. I also don't believe it should be something that simple possession means that you should end up in a criminal justice system.

And so that's why, as I say, when I was a DA, we sort of de facto came to a point where the city of Madison enacted a little ordinance and you'd pay a $25 fine. But there are a couple problems with that as it has moved along. One is that's in Madison. You could drive to a county 40 miles from Madison and get convicted of a crime. So it's very uneven enforcement.

And the other problem is while we minimized it, having a black market did mean that in law enforcement you had to have people who were making very calculated mercenary decisions to go out and violate the laws of the state of Wisconsin and make a lot of money doing it, you couldn't just turn your back on those people. You couldn't say, well, that's OK, you can do it.

So we were in this sort of untenable position, and have been for years, I think, where we're saying it's kind of OK to use it, but anybody who does anything to do with getting you that marijuana is now a criminal. And they are criminals, by the way, the people who at a large scale are doing that. And they're not nice people. They're making a very calculated decision to break the law and make money doing it.

But on the other hand, I think it's very hard-- and I'm speaking somewhat politically as well as personally, and I think there is probably very good public health you'll hear about here-- that you don't want to put the stamp of approval on this product either for a lot of reasons. If somebody had just come out of nowhere and said, here's tobacco. Wouldn't it be great? Let's start putting it into the place.

We'd find all kinds of reasons to shut tobacco down. By the way, did you know that it was actually illegal in 15 states to smoke tobacco during prohibition times? So a little fact I've since learned at the Harvard School of Public Health. So in the end it's a balance and a very hard balance. And one that we're now being called on to make the decision between I think most everybody agrees-- most people on medical marijuana-- that the use of marijuana shouldn't be seriously punishable.

I think some people believe that it should be punished, some don't, but not seriously. I think most people believe we should be doing things to make sure that this is out of the hands of children. I'm not a medical expert, but I've raised teenage boys, and marijuana is not a good thing for adolescents. I believe that really strongly. How you put all those together I guess is the real challenge that is in front of us right now.

But those are the issues. And they come down and it's legislatures that finally decide these things, elected bodies. And the cultures of states will be very different. So I think people are going to be looking very closely at Washington and Colorado in the coming years, state legislatures are to make the decision on what direction they're going to go in.

SCOTT MALONE: And we will take up discussion today of those two states where marijuana is now legal for recreational use. And we're fortunate, in fact, to be joined by Skyler McKinley from the Colorado governor's office. However, before we cut to Skyler, let's take a brief look at a clip from Reuters of a production facility where marijuana is being grown for recreational use. There's no sound for this clip, I'll warn you in advance, but the footage will give you a sense of what the large scale production looks like.

And with that, let's turn it over to you, Skyler. Why don't you explain to us a little bit about what your office does and your role in Colorado and marijuana.

SKYLER MCKINLEY: Sure. Happy to. And thanks so much for having me. I guess I should start out by saying that it's certainly not my job, unlike some of the other panelists to discuss

whether marijuana should or should not be legal or illegal for recreational or medical purposes. I basically work with the implementation of what the voters in Colorado told us to do, which was let's have it legal.

Since the governor has taken office, Colorado has gone from 40th in job creation to 4th. Of the top 50 communities for startups, I think four of the top 10 are right here in Colorado on a per capita basis. We've got the second most educated workforce in the country by some metrics. For about the past decade we've been the number one destination for Millennials. So we have all these great things in Colorado, and yet what everybody wants to talk about is marijuana.

And I think that's why my office exists. I think to understand what I do at work every day, you have to look at the office name, and that's the Office of Marijuana Coordination. And what that means, understandably, is there's a lot of moving parts involved with setting up what's the world's first retail recreational marijuana regime. So I guess our office exists because there's all these state agencies that are involved by statute and by the Constitution involved in the implementation and regulation of Amendment 64, which was the ballot initiative that legalized marijuana in Colorado.

So our office exists to get them communicating, to get them working in tandem to achieve the governor's top three policy priorities really as efficiently, as elegantly, and effectively as possible. So what does that mean on a day-to-day basis? Well, so we work with these state agencies from the Public Health Department, to the Department of Revenue, to the Department of Health Care Policy and Financing, to the State Patrol to carry out the people's will in kind of three main policy arenas.

Number one, which the governor alluded to, it's decreasing youth marijuana use and consumption by way of our regulations, public education campaigns, and youth prevention programs. Number two is maintaining public safety. What's that mean? Well, right now it means preventing marijuana impaired driving, much as we prepare alcohol impaired driving and making sure that marijuana related crimes are policed pretty effectively.

And then the number three is the much more difficult policy area, and that's promoting public health. By providing options for substance use disorder treatment services, educating consumers on responsible legal use, and creating pretty stringent health and safety standards for industry. I say that's the trickiest because, as I think everybody in this room knows, human behavior doesn't operate like a switch.

So we legalized marijuana in Colorado, but what does that mean from a public health perspective? Well, in the first 10 months, we don't think there are new substance use patterns or substance abuse patterns. What's that going to mean in 10 years? Well, that's the real public health challenge. So these are the three areas we work. We work some days we work just on marijuana impaired driving, some days it's working with treatment providers to find something that works statewide.

It's just making sure that as we do this, as we implement the people's will we talk together as much as possible.

SCOTT MALONE: Great. Well, thank you very much, Skyler. And with that we're going to hand it over to A. Eden Evans of Massachusetts General Hospital. And why don't you tell us a little bit about what the current science says about cannabis addiction risk and other health effects.

EDEN EVINS: Sure. Thanks so much for having me. I'm Eden Evins from Mass General. And maybe I think a place to start is to understand marijuana and its constituents, THC and cannabidiol and others and how they act on the central nervous system. They act on the central nervous system in the brain. Marijuana is taken recreationally for its intoxicating effects and it's reinforcing to humans and animals.

Some of it is used for reduction of pain in HIV, for reduction of anorexia with cancer, spasticity with multiple sclerosis. And these may be effective medicines for some of these illnesses. In fact, there are three FDA approved medications that include THC or cannabidiol. I think the cannabidiol is coming. And so effective medicines that act on the brain usually have adverse effects.

And if they're effective for the underlying illness, which we need more research to prove, then we generally weigh the risks and benefits of the beneficial effects on the illness against the risks inherent in effective doses of those medications.

And so to back up, the effects of cannabis on the brain can really be understood by where it acts. Cannabinoid receptors are found in high density, in areas of the brain that influence pleasure, but also memory, thinking, concentration, movement, coordination, and sensory and time perception. And if you think about where it acts, you can anticipate where the adverse effects may be.

And so THC acts similarly to the naturally occurring endogenous cannabinoid, so anandamide and others. And so when someone smokes marijuana, THC stimulates these cannabinoid receptors artificially in disrupting function of the endogenous cannabinoids. An over stimulation of these receptors in key brain regions produces the high as well as other effects on mental processes.

And over time this over stimulation can alter the function of canndidiol receptors along with other changes in the brain. This can lead to addiction, to withdrawal symptoms when the drug stops, and to effects on cognition. And you can break that up into two forms-- acute effects and more chronic effects. And acute effects include impaired coordination, slowed reaction time, slowed processing of particularly unexpected events or complex events.

And we've seen some effects of that. Washington state reported a 50% increase in impaired driver cases testing positive for THC from 2011 to 2013 when there became more widespread availability of marijuana. A nice report in the British Medical Journal two years ago was a meta analysis of nine studies showing a twofold increase in car crashes associated with THC use.

So to put that in perspective, with ethanol you have about a seven-fold increase of a crash, with marijuana you have about a twofold increase of a crash. And these motor control deficits probably come from changes in the brain which we've seen such as lower cerebellar metabolism in people who use marijuana. And heavy users have been shown more recently to have reduced cerebellar volume.

So it's changed in structure and changed in function in the brain region associated with motor control. The other really important acute effects are impaired short term memory and difficulty with complex tasks. Now, we are not clear on how long these effects last. And I'm very concerned with whether they're persistent effects. But we're clear that there are acute effects. And acute effects will have a negative effect particularly in children who are trying to learn.

So school children attending classes using frequently are going to have reduced learning, reduced memory. And certainly we've seen drug related high school suspension spike in 2010. They went from 3,300 to 4,500 just from 2010 to 2011. So we're seeing increased use in the schools making these sort of salient for this period.

SCOTT MALONE: And what about the risk, the idea of marijuana as a gateway and something that can lead people into the use of other drugs?

EDEN EVINS: So the best study of that to date-- these are studies that are ongoing-- but there's one very nice study in animals showing that pre-treatment with THC increases the addictiveness of nicotine. And we know that nicotine does not need much help with increasing its addictiveness, but this has been shown recently. So there's more biological evidence backing up this sort of problematic, epidemiologic evidence which is sometimes hard to control for.

But you might wonder why I'm focusing on adolescents, and it's because it seems that adolescents are at particular risk. So in several studies, one in 2011, people matched for IQ and marijuana use, those with early onset-- so teenage onset of marijuana use-- had significantly poorer sustained attention, cognitive inhibition-- which is sort of effective control-- and abstract reasoning compared to adults who started using.

So this is sort of executive function underlying critical decision making, which is something we really want our adolescents to be able to do is effected, primarily by those who begin regular use at an early age. And a small study at MGH also tested

kids early and didn't find executive function difficulties. Tested them five years later, those who had started using marijuana had worsened executive function.

SCOTT MALONE: Great. And that might serve as a nice segue into our next guest who's joining us remotely. Igor, for the Center for Medical Cannabis Research. Igor, can you tell us a little bit about what the research has shown about medical benefits, particularly as regards pain management of marijuana?

IGOR GRANT: Sure. I'd be happy to. I'm at the University of California, San Diego. By the way, since I'm remote can you hear me OK?

SCOTT MALONE: Yes, we can.

IGOR GRANT: OK, great. So I'll give you one brief background as to kind of where our group is coming from. As people may know, California was actually the first to pass what was called a Compassionate Use Act, which was a state initiative that envisioned provision of cannabis to patients who may need it on doctor recommendation. And that was in the mid '90s. And then in 2000 the legislature of the state of California decided that there should be some research conducted on possible medical benefits and side effects and so forth.

And so they funded the Center for Medicinal Cannabis Research at the University of California, which I direct. So that's who I am. Basically, our work was funded to do short term efficacy studies. And we focused on two areas. One was painful peripheral neuropathy, which for your listeners, refers to a type of chronic burning hypersensitivity pain which can complicate conditions such as diabetes, HIV/AIDS, certain kinds of injuries, toxicities of certain medications like anti-cancer drugs and so forth.

And this is a painful condition that is disabling and although treatments exist, they're not always effective. And because of animal and anecdotal literature, we focused on this area. And basically in the short term, what we found was that administration of smoked or inhaled cannabis did reduce peripheral neuropathic pain substantially. And the size of the effect was very comparable to that of existing drugs.

And in some studies actually this was added on top of existing treatment and provided further benefit. And the other study focused on severe muscle spasm in multiple sclerosis. MS is a neurologic condition as people may know, chronic. And spasticity in muscles can be also disabling, painful, limit a person's activities. Again, there are treatments, which are not universally effective and cannabis did show efficacy here, as well.

And that also comports with the results of some other data by studies done elsewhere-- Canada and elsewhere. So basically our conclusion is that there is evidence from short term studies that cannabis can be helpful in neuropathic pain and spasticity of MS.

As one of the speakers mentioned earlier, there's already evidence of a benefit of THC, particularly in the management of anorexia then severe weight loss due to medical conditions of various sorts as well as anti-nausea properties. THC as [INAUDIBLE] is already licensed for those purposes. I think where it leaves us is that these short term studies need to be confirmed and extended with longer term studies with more representative patient populations and particularly looking at we studied people mostly in [INAUDIBLE] adults.

What about elderly people and so forth. So there are a number of questions that remain.

SCOTT MALONE: Wonderful.

IGOR GRANT: The last point I would-- can I make one more point and then we can come back.

SCOTT MALONE: Sure.

IGOR GRANT: I think it is very important, as the governor mentioned earlier, to cause separation between discussion of medical uses and indications and how that should be covered as opposed to recreational and another social policy issues. I think we should bear that in mind.

SCOTT MALONE: Great. And that leads very nicely into I think what we're going to talk with you, Jeff.

Obviously we have this patchwork of policies out there. What do we know about how effectively the policies accomplish their stated goals?

JEFFREY MIRON: So if I can, I'd like to just touch briefly on a few other things and get to that at the end. So first I would like to suggest that this topic is not just a public health topic, there are a lot of dimensions of the question of legalization versus other policies and involve effects on crime, on budgets, on civil liberties, and most fundamentally on people's freedom. I think that should be included in the conversation.

On the public health effects, I would emphasize that there's a huge range of studies out there about things like the effect of teen use on IQ, and there's lots of disputes about the validity of some of those studies. So it should all be taken with a much bigger grain of salt than it sometimes is emphasized. Third, we shouldn't ignore the fact that even if use does increase substantially under legalization or medicalization, there are benefits that many people perceive they get from using marijuana even just recreationally.

Some people think it makes them happy. Some people think it makes it more fun to go to parties. Some people just like the feeling of being stoned. In a free society that's their right, not the government's right. It's certainly one effect of trying to restrict access that should be part of the discussion. Fourth point, the budgetary impacts, which is one of the reasons that I was here because I've studied that, I think are way overstated.

The budgetary effects in terms of tax revenue and reduced expenditure on police are quite small because marijuana is just one product among zillions of products. It can't possibly lead to that much extra tax revenue. And de facto, most places have moved a lot in the direction of legalization, so they're not spending that much police, prosecution, incarceration money on marijuana at this point anyway.

So there will be minor savings, but not major savings. And then last, the point that Scott sort of pointed to, whatever you think about any of those issues, a crucial question is whether different policies have major effects on how much people use and on all the other things that people associate with use from traffic accidents, to

crime, to reduced teen educational outcomes, and so on and so forth.

So I have just finished a paper that looks explicitly at Colorado and collects all the data that are available on any indicator you can think of. Now, unfortunately, we don't have direct data yet on use post legalization. There's a lag in a collection of those data. It will be about another year and a half or two. But we have some fairly recent data on marijuana tax revenues, on crime, on traffic accidents, on teen graduation rates, teen test scores, and so on and so forth both before and after legalization, and before and after a major commercialization of medical marijuana in Colorado which made it much more widely available.

And the summary is really simple, it's almost impossible to detect any effects of these changes in marijuana policy. In increasing use, decreasing use, increasing crime, decreasing crime, whatever you look at, you just can't see any effects. So that suggests that if it costs money to enforce the policy that's not affecting anything, then it's probably not a very sensible policy.

SCOTT MALONE: Now, I think I think regardless of that, obviously we have these two states, Washington and Colorado, that have had legalized it for recreational use, and people are certainly going to be watching to see what the effects of those policies are. And I think that's an appropriate time really for us as a country to wonder as we're studying these two states and as you have other states considering similar moves, what would success look like?

In a state that legalized recreational marijuana, what would a model be that would be, this is clearly a successful experiment? What would a model be that this was a failed experiment? And what should other state's, lawmakers, policymakers, look to to say, well, we should go down this road or let's not do that. Let's avoid that. Governor.

JIM DOYLE: Well, the one set of facts I would really want to understand, because I agree with much of what was said about individual people being able to make individual choices, the one thing is what is the effect on adolescent use of marijuana. If, in

fact, the testing and the studies demonstrated that there is not any increase, I would say legalize it in two seconds.

Then depending on what those studies show, the question becomes more and more difficult. If it's just a question of adults making an adult decision, the one other one on a public policy matter is the driving issue. And obviously we have tests now that accurately test for alcohol and our laws have all been developed in a way that if you're over 0.08 and so on it's a violation. And if we could arrive at that same point with medical understanding of what the levels are that actually affect driving and arrive at that kind of regime, that's what I would be interested in.

But those are the two policy matters that I would be interested in because if it's just a matter of whether individual adults should be able to use marijuana or not-- this is me speaking, not the Wisconsin legislature or whatever-- but I think that's for the adults to make that decision.

SCOTT MALONE: Eden, you were talking a bit about the concerns associated with adolescent use of the drug. And what do you see as what should people who are studying Colorado and Washington state be looking for as regards to adolescents?

EDEN EVINS: So I think it's very interesting that you said what would be success of this experiment. And I think that's what we're doing. We're experimenting really with our young people. That's where the data are that are not promising. They certainly need replication, but what we know so far is not promising for a good effect for our adolescents. Could you show the first slide, actually?

The marketing is to kids and quite obviously-- candies, et cetera. Now kids have almost a double chance of becoming addicted if they use as compared to adults. And if they use heavily, the estimated addiction rates are 25% to 50%. So I think we're talking about an experiment. And we talk about costs, et cetera. But if the first study is showing a potential for an eight point IQ loss in kids is accurate, what is that worth in financial terms?

I think that that's hard for an economist or anyone to get their heads around. So my

sense is that what we know is not enough but we're moving ahead very quickly without knowledge.

SCOTT MALONE: Jeff, is there any research, you've spoken a bit about the disconnect previously between something being marketed to a group and how effective that is-- whether it captures them, whether it leads them in. Is there any research that's been done on this issue of marijuana and marketing and younger people?

JEFFREY MIRON: I'm not aware of much evidence on marijuana marketing because it's not a legal product for the most part. Even in a few places where it's sort of legal, it's still illegal under federal law. And so the advertising has been shut down. There's certainly evidence from many, many other products. I would suggest that the vast majority of advertising switches people's brand choices but has minimal effects on whether they choose to use the product.

Think about Coke versus Pepsi, or Budweiser versus Miller, and so on and so forth. So I am very suspicious that making it legal has a major effect on whether teens use, but I'm not disagreeing with the notion that it should be restricted to adolescents. We know from experience with alcohol that's not going to work perfectly. Lots of adolescents are still going to get access, but we're always trying to balance the pros and cons of these policies.

There's no perfect policy. Anything we do is going to have some negative side effects and the question is which ones you want to worry about the most.

SCOTT MALONE: To me in many ways that's one of the interesting things about this is that that this is happening at a time when broadly across the United States there's a lot of other public health areas consumer products that we're really trying to restrict or policymakers are trying to restrict use of. There's been a lot of changes in policies around tobacco smoking and where you can smoke, how much it's taxed.

We saw it in New York City last year the attempt to greatly regulate soft drink size. To what degree should that be a factor in our discussions of this? The public health consequences of greater access to marijuana?

EDEN EVINS: I think you and others, many have written that there really is not much argument that increasing availability will increase use. And marketing-- we're talking about initiation of us. So Joe Camel, for tobacco, certainly was a factor in increasing initiation or experimentation. Same with electronic cigarettes. There's recently a letter out from a number of congresspeople to E-cigarette makers really taking them to task for marketing cotton candy flavored electronic cigarettes while claiming they're not marketing to kids.

And now for marijuana products there's marijuana soda, marijuana Klondike bars, marijuana kettle corn, you know, Nutella. Nutella with like 320 micrograms of hash oil per cup. It's very strong. And in 2009 there were 375,000 marijuana related ER visits. So and a new diagnosis, there were never pediatric marijuana overdose admissions, but the American Academy of Pediatrics reported last year a new diagnosis-- marijuana overdose in kids, including babies having access to baked goods with marijuana.

So I think that there's a real down side.

SCOTT MALONE: Great. Jeff.

JEFFREY MIRON: So I just want to say as something to think about in deciding how to improve the public health, if that's the objective. The tobacco case, we reduced tobacco consumption a huge amount in the United States and many other countries while it was still legal. So all sorts of public and private actions were taken-- combination of restrictions on where you could smoke, on higher taxes in some cases, on doctors telling their patients not to smoke, on coaches telling the athletes on their teams not to smoke.

This dramatic reduction without having created a black market, without having drive by shootings over cartons of Camels and so on and so forth. So, again, none of these is perfect, but the prohibition approach, that is the opposite of legalization, has these huge negative side effects that we should be concerned about.

EDEN EVINS: But wouldn't you argue that if we were at the brink of legalizing tobacco and we had

early indications that the odds ratio was 30 for lung cancer for smokers of tobacco, we might have approached the commercialization of tobacco differently?

JEFFREY MIRON: I would argue that we shouldn't have. I would argue that people on the whole have enough common sense that relatively few people would take up a product that has that level of risk relative to benefit. I also would argue that that's their choice.

EDEN EVINS: That may be true, but not for kids.

JIM DOYLE: The problem is the addictive nature of the product. When I was governor and Attorney General, I'd always put this proposition-- show me one person over 21 years of age who has never smoked tobacco, who has now looked at the whole situation over, done the studies, looked at it and decided, you know, I think I've decided I'm going to smoke. The reason people are smoking when they're over 21, I mean, I was in the tobacco lawsuits, the reason is because they were addicted when they were 13, 14, 15 years age.

I always said publicly that I would give $100 to anybody who could show me that and I've never had somebody be a taker.

JEFFREY MIRON: Fine. But there were also zillions of kids who never took up tobacco despite all the advertising and all the attempts to get them hooked. There were zillions of kids who tried it a few times and didn't do it anymore. There were kids who used it regularly and stopped as 20-year-olds or 30-year-olds.

JIM DOYLE: Do you really believe, just as was stated by Eden, if we were at the absolute-- but we had never seen or heard of tobacco before and it was just ready to be introduced into the United States, you would be in favor of the introduction of this product?

JEFFREY MIRON: I'm not saying that the government should introduce it. I'm saying it should be legal for private sellers to manufacture it and sell it. But, and again--

JIM DOYLE: Because I don't think it's personal choice, it's an addiction that's created early. And that's the big problem with marijuana.

JEFFREY MIRON: Addiction is easily overstated. Many, many people stop using highly addictive substances.

JIM DOYLE: But many people who have stronger will power than I.

JEFFREY MIRON: And many people who you think as addicted think they're just consuming something that they like.

JIM DOYLE: Whoa. Tobacco?

JEFFREY MIRON: Yes. Yes, tobacco.

SCOTT MALONE: There are also a range of products out there that may have addiction potential that also have potential medical benefits. And with this I'm thinking of, we're facing a national crisis of it now-- opioid drug use, which they are prescribed for pain management. Yet, as we've seen, that can also lead into a public health crises. We've seen people getting legal prescriptions segueing into getting the drugs illegally and taking them, segueing into taking heroin because they're illegal.

But with that there is an awareness that there is a medical purpose for these that's appropriate. And that's actually one that I wanted to direct back to you, Dr. Grant. The need to separate the two pieces of this debate. The medical marijuana versus the recreational, if not free-for-all more open access as opposed to getting it with a prescription for a medical reason.

IGOR GRANT: Thank you. Yeah, I feel that because we have conflated or kind of mixed up the discussion about legalization of recreational use and so forth with the medical, it's really slowed down the medical progress here. Marijuana or the cannabinoids are not magical. So they are not all good, as some would argue. And they are not Satan either. So they are a series of chemicals that, by the way, our brain was not created in order to enjoy marijuana.

Our brain and other organs have internal signalling systems that utilize chemicals that look like the cannabinoids in some ways to perform essential functions in our body. And these functions include things that were mentioned before-- various kinds

of brain activities, attention, memory, coordination, so on and so forth. They also have other effects, anti-inflammatory effects. They have effects on regulation of appetite.

Interestingly, there are these cannabinoid receptors even on sperm. So they have something to do with reproduction probably. These are very ancient systems that are in many, many organisms. My point in saying all that is that progress in medicine often results from our understanding of these internal systems, how these internal systems may go awry in some disease states, and then can use this knowledge to correct whatever those imbalances are.

And so the cannabinoids are part of the answer to conditions such as pain. They may have, in fact, some value in other conditions. But we need to do those studies. For example, there are preliminary data on anti-psychotic, that is anti-schizophrenia type of effects of cannabidiol. You've seen Sanjay Guptaa's show on the children with intractable epilepsy. And there may be, as I say, anti-inflammatory effects and so forth.

It's not a panacea, but it's something that needs to be researched. However, this debate that always puts together the legalization of marijuana and recreational use with medical, really has impeded progress in this area. And that's why I urge separation of this debate and to conduct really more comprehensive trials in this area.

SCOTT MALONE: Great. Now, Skyler, we began this portion of the conversation speaking a little bit about the question of what would success look like and what would failure look like. And obviously the country is looking at you or your state, not maybe you personally, as well as Washington. And I'm curious, from your office's perspective, what are the outcomes you're managing to?

What are the benchmarks you are using as you go through the early years of this new legal framework?

SKYLER Sure. Well I'll start by saying it's lucky that I'm not camera shy. I guess when we talk

MCKINLEY: about success and failure, that is not a 10 month conversation, which is where we're at now at least in the long term. But over the past 10 months I can tell you what is working. And I think the Brookings Institution came out with a report a few months ago that kind of alluded to this.

But by and large, the way we regulate this works. A regulatory model seems to be doing its job just fine. We had a sting that showed perfect compliance among recreational dispensaries not serving to youth. I don't want to say that our model is the perfect model. I don't think that we have conquered every challenge. But what is working and what Brookings alluded to is that the way this is modeled-- and this is the governor's whole philosophy-- is we're going to bring stakeholders of different stripes together to the same table where they're going to sit down, they're going to figure out what's working, what's not, they're going to shout at each other, they're going to disagree, they're going to agree, and then they're going to write rules.

And they're going to help write legislation. And they're going to help figure out what needs to happen for this to work. And that's everybody. Those are people who are involved in the cannabis industry, those are people who oppose it vehemently. Those are people who work in public health communities and think that cannabis is dangerous, people in public health communities that think cannabis is really a miracle drug.

SCOTT MALONE: What have you learned these first 10 months into this? What have you learned? Are their course corrections you've made? Tweaks that you've made along the way? You're the model. People are looking at you.

SKYLER MCKINLEY: Sure. So a good example is edibles. When the people of Colorado implemented or voted, rather, for amendment 64, certainly edibles were legal because of the amendment, but we didn't know how to regulate that because edibles for recreation consumption were slightly different then edibles for medical consumption, which we previously had. So what have we done on edibles?

Well, there were some bad news stories that had to do with edibles, famously Maureen Dowd's column where she got a little too high. I think everybody read it. So

what did we do. We brought experts, we brought stakeholders, we brought constituents together and we put emergency rules in place through this working group model, and we're going to have permanent rules soon. So what are those rules?

Well, it's legislation that's going to require opaque child resistant packaging for edibles. We're going to require that edibles manufactures stamp their products with a universal symbol so that you know that there's marijuana in a product. We have regulations in place now that serving sizes are limited to 10 milligrams of THC per serving. That needs to be intuitive to the consumer. And we're working with our Department of Revenue to develop something similar to the safe serve program that exists for alcohol where we train "budtenders," they're called, on how to explain a product to consumers. And so that's all happened in the past few months when we realized that, hey, we need to course correct on edibles.

And if these regulations don't work, we're going to all sit down again and say, all right, these didn't work. These ones did. What can we fix? What can we do better? What did we do perfectly?

SCOTT MALONE: Great. Thank you. Well, I mean, we have a lot of great ideas here in this room out in Colorado out in California, we also have a lot of viewers watching remotely and listening. And at this point we're going to turn it over to some Q&A. First from some of our online participants and then we'll take some questions from you folks here in the studio.

LISA MIROWITZ: Thanks, Scott, and thanks to all of our panelists. We have a very active chat going on and there are science questions and policy questions. So I'll just start with this one. This is from our live chat. Does marijuana use have positive cognitive effects separate from the executive function?

EDEN EVINS: So I'll be happy to start with that. So marijuana has many constituents. The ones you hear about are THC and cannabidiol. And these act actually quite differently on some aspects. So THC is what's thought to give the rewarding properties but also causes anxiety, paranoia, can worsen symptoms of schizophrenia. Then there's

cannabidiol which may actually have some anxiolytic properties. It may reduce some psychotic symptoms.

It actually may be a treatment for pediatric epilepsy. There's a study ongoing at my hospital as a treatment for pediatric epilepsy. So there are certainly elements in cannabis that may be therapeutic. You had asked what success would look like. And I think success would look like making more cannabis available for study so that we can understand sort of what are the risks of heavy use, of early onset, and are there safe levels of use.

Is there a safe age of onset when you don't have a cognitive hit? And more tests being done for efficacy for pain, spasticity, and epilepsy. I'm not aware of positive cognitive effects of acute intoxication or chronic use of marijuana.

LISA MIROWITZ: Thank you. Thank you. I'll take one more and then we can go over here.

IGOR GRANT: One thing.

LISA MIROWITZ: Oh, I'm sorry. Please go ahead.

IGOR GRANT: One thing. Maybe this is a little bit tongue in cheek, but drivers do drive slower. So--

[LAUGHTER]

SCOTT MALONE: The traffic policy component we've neglected thus far. OK. Was there another?

LISA MIROWITZ: Of course they're having a lot of questions around messaging to kids. So I'll just try to take one here. If marijuana is legal for adult use in states like Colorado, what efforts are being put in place around messaging towards kids in schools and community settings? What lessons on this can be shared from the states of Washington and Colorado as we face elections this November in three other states?

SCOTT MALONE: Skyler, it sounds like that's one maybe that you should take the first crack at.

SKYLER MCKINLEY: Sure. I'll jump right in. And, again, I'm not here to tell Oregon, Alaska, or the federal government, Washington, DC what to do with marijuana, but I can say what we're

doing in Colorado. So what's really nice about sin taxes is, we think sin taxes, including a tax on marijuana, they are a bad way to fund government in general because they incentivize the sin. Right? But they are really good to fund the costs associated with the sin or with the use of the product that's being taxed.

And so when it comes to youth prevention, that's the governor's top priority. And that's where we're allocating a lot of our marijuana revenues. Specifically we've got about $17 million in revenue that we're assigning for public education and improving youth prevention programming. So what does that mean? Well, there's a couple million dollars going to school health professionals so that they can identify and know if a student is a problem user of marijuana.

School-based intervention services. There's also money going towards what we call the Tony Grampsas Youth Program, a youth services program. And that provides alternatives. It's an after school program. And we know that if we give kids between 8 and 12 something to do after school, they're going to do it and they're not going to go use marijuana. So, I mean, we're doing a lot of stuff. $17 million, like I said, for public education youth prevention. $4 million in treatment and other prevention.

And that's all coming out of what we call the Marijuana Tax Cash Fund. So marijuana revenues are being used to pay for the costs of having legal marijuana.

SCOTT MALONE: Great. Thanks. Jim, you also have the government perspective. And you mentioned this as being a top concern of yours. Quick thought?

JIM DOYLE: Well, I was very much involved in the tobacco litigation as Attorney General. And a whole host of things came out of that. The elimination of Joe Camel came out of that lawsuit. No longer being able to put in advertisements at sports facilities. There's a whole range of directives that I do think the time has shown, among other things that have gone on, has had a reduction in the amount of tobacco.

The one thing that's what I'm really interested in is whether the marijuana businesses-- the people that are going to make money legally selling marijuana-- are motivated strictly to limit their customers to adults. I don't know the answer to

this. Because it's clear from the tobacco litigation that the tobacco companies for decades were not ready to limit it to adults and had focused on children.

So I think one of the things I would really be interested to watch in the legalization states is by making this a legal above board business, do you in fact have companies now who are not playing games with this? Some of those pictures we saw on that slide are disturbing because they were a lot of like what would happen in tobacco candy cigarettes and things like that directed at kids.

I don't know the answer, but I can see that a legal above board business who can make money selling to adults is not going to be motivated going after kids. That's one of the things I would really be interested in seeing.

EDEN EVINS: But it may be very bad business. I mean if 9% of cannabis users start as adults become addicted, but 16% of those who start as kids become addicted, it's not good business, perhaps. I don't know if you could show the second slide. It may answer this person's question. Sort of attitudes about the risks of marijuana. The perception of risk is going down. And this is mirrored by increase use. And you can see that has fluctuated over time. But at this point with the legalization and messaging, perception of risk is going down.

And I don't see much to do that's happening that. My small sample, I go and speak to the Belmont Middle School locally. And they all know tobacco is bad for you. They don't smoke. But they think that marijuana is fine. It's an herb. It's a natural product. It's a medicine. It'll cure my anxiety, my depression, all the things that it may actually worsen.

SCOTT MALONE: You do see that. In a generation we've had a profound change in Americans attitudes in tobacco. And that you see most vividly among children. Did we want to take another one from online or from the room?

LISA MIROWITZ: We can take on from our audience?

AUDIENCE: Oh, have I been waiting for this. I never thought I'd be at Harvard and be an expert

in something, but I'd like to introduce myself. My name is Tracy Gamer Fanning and I am an 8-year year survivor of a malignant brain tumor. I was diagnosed in 2006. I was put on a regimen of medications after brain surgery. I was paralyzed. Everything from dilauded, percocet, vicodin, sleeping pills, ativan, valium--

SCOTT MALONE: It might just be quicker just to list what you didn't take.

AUDIENCE: Literally I have a drawer full of medications. And I had an 18-month-old daughter and a four-year-old son. And I wanted to be a mom for as long as I could be. They told me I had a three to five year life expectancy. I'm eight years out. I started using medical cannabis-- thank you-- in 2008 during radiation. And my doctor at Hartford Hospital, the head of Hartford Hospital, was the one who suggested I use it.

SCOTT MALONE: Wonderful story. Did you have a question for the panel?

AUDIENCE: I actually just wanted to mention something that you guys were talking about, about gateway drugs. I have three stepchildren and two children, all of them teenagers. They know that I use medical marijuana for brain cancer. And I can tell you that not one of them has ever gone to a party and been handed a joint and my kids thought, oh, this'll be fun. They thought, oh, this is my mom's brain cancer medicine.

And talking about it as a medicine, not recreational, but talking about it as a medicine, you can change the perspective that children have if you talk about it as a cancer medication.

SCOTT MALONE: So messaging? Messaging being the important piece of this.

AUDIENCE: I think that's a good example of we just need more research. I am Dr. Denise Valenti, and my expertise is in cognition, the visual system, glaucoma, Alzheimer's, Parkinson's, MS. That's what I work with. So those are all pathologies that are involved in some of the recommendations for medical marijuana. One of my concerns though, all of the pathologies I just mentioned, may have underlying baseline impairment for driving.

So we really need to seriously look at the driving. And one of my questions is

actually for the gentleman from Colorado. What I am hearing anecdotally, because the research isn't out there, is one, I have a concern about the medical population. But a larger concern is about the recreational group who are now while marijuana may slow you, it does impair a lot of cognitive functions, the combination of marijuana and alcohol.

And then one comment, I didn't hear anybody mention the Minnesota approach where they allowed for medical marijuana but somewhat are going to eliminate recreational use in that you can't smoke it, there are no edibles. It will be vapor, mist, pills, or tinctures, which is a wonderful compromise. Anyway, the driving issue is a big concern.

SCOTT MALONE: Yeah. Skyler, if you wanted to weigh in on that.

SKYLER MCKINLEY: Sure, so I think the other panelists and I keep coming back to this. There's not a lot of data. For other states looking to legalize, I think making sure that you've got a data governance structure in place before you go forward is the most important when it comes to things like driving high. So what you're talking about is mixing alcohol and marijuana. I think there's data or some studies at the national level showing that's really, really, really dangerous.

So what do you do about that as a government? Well, we rolled out our drive high get a DUI campaign through our department of transportation. That's also being paid for with marijuana dollars. And it's creating a culture of responsibility. And a lot of that, I think credit needs to be given to the marijuana industry in that these folks on the ground, if somebody comes in drunk, I think a budtender is not going to sell to them.

There's a lot of responsibility. There's a lot of compliance and self imposed compliance right now in this 10 month period. Whether that will exist in five years, I don't know. But we're in the honeymoon period right now where everybody wants to succeed. And for this to succeed it's making sure that people aren't using this dangerously. Are people going to drive high? Are people going to drink and smoke and then drive?

Probably. That's human behavior. But government exists to really say, don't do this. This is dangerous. Let's make sure this doesn't happen and encourage others who are not government actors to do the same. And I think that's what we're doing.

SCOTT MALONE: And at least for now what you're saying is essentially the industry is trying to self police because of the spotlight that they have on them.

SKYLER MCKINLEY: Exactly. Well, and they know that compliance is the easiest way for them to be seen as a leader in the state on this. And I think this is the state where you want to be seen as a leader.

EDEN EVINS: So from medicinal use for your clients, though, the dose may be very different. And we need to know more. But often medicinal use is like two puffs three times a day and so a joint lasts a week or three days so that they're not driving high. Now we don't know about how much impairment comes with that lower dose. So it may not be as much of an issue.

JEFFREY MIRON: So the research consistently shows that people who have consumed marijuana are impaired as drivers. It also shows they are less impaired than people who consume alcohol. In addition, numerous studies find that when there was some policy change that led to a difference in the relative price that made marijuana cheaper relative to alcohol, there appears to be a substitution away from alcohol toward marijuana and declines in traffic fatalities.

So, again, drinking and driving is a bad idea. Smoking and driving is a bad idea. But the question is about the policy. The policy of giving people more choice seems to have led to beneficial effects, not negative effects.

SCOTT MALONE: Eden, did you have some data that you wanted to give out right now?

EDEN EVINS: That's trotted out a lot. And actually the data are not there to show that there is substitution of--

JEFFREY MIRON: I didn't say that.

EDEN EVINS: --of cannabis for alcohol.

JEFFREY MIRON: Come on.

EDEN EVINS: So there's not data for substitution.

SCOTT MALONE: Did we want to take another one?

LISA MIROWITZ: I'm sorry. We could go on. There's a lot of opinions about this. But I think we're getting ready to wrap up.

SCOTT MALONE: OK. As we move towards cruising to the end of this panel. One thing that we're going to ask each of our panelists to do is to just offer a succinct and brief policy take away. This is something that Harvard plans to present to policymakers around the United States, around the world, whoever's interested. And I think we'll just go through in the order that we introduced everybody in. So we will start with you, governor.

JIM DOYLE: I'll say that the one thing I've learned today is my wife is a very slow driver, and so I wonder what she's doing in her spare time.

[LAUGHTER]

But I do think this discussion seems to me ends up centered on two things. One is how do we make sure medically marijuana is available for people who need it? And I really appreciate the doctors urging us to separate that discussion off from the broad recreational use. And the second is, what really is the effect on young people? And to me, those are the issues that I think really need to be looked at and studied. And, frankly, as I said at the beginning, I think we are forming broad, national consensus around this, which is medical marijuana, I think the opposition to that has faded.

The only opposition to it is can you set the system up correctly? And on the second, I think we're moving towards obviously making it less of a serious offense. And where along the scale from total legalization to a very serious criminal offense,

where in that scale are we best--

SCOTT MALONE: Where is the new normal?

JIM DOYLE: Where is the new normal Good point.

SCOTT MALONE: Great. Eden.

EDEN EVINS: Yeah. So legalization brings the power of the marketplace that will certainly increase availability and use in young people. And it's begun before we know the full risks of exposure in adolescents whose brains are developing. So this is a large scale experiment on the next generation. And it may be a generation before we are able to understand what we've done.

SCOTT MALONE: Jeffrey.

JEFFREY MIRON: So I would say that prohibition was the experiment. Prohibition of marijuana and other drugs. Hey, we had a free society on that dimension before we outlawed them. And that experiment of trying to outlaw bad outcomes, get rid of bad outcomes by outlawing a substance has failed, and the right thing to do is to take marijuana out of the Controlled Substances Act, indeed to repeal the controlled Substances Act more generally, but I'll leave that aside for today.

Barring that, moving marijuana from schedule one of the Controlled Substances Act, which says that it has no medicinal use, it has extreme potential for horrible effects, clearly exaggeration, into schedule two where doctors could legally prescribe it under federal law would be an enormous step in the right direction.

SCOTT MALONE: Great. Out to Colorado and you Skyler.

SKYLER MCKINLEY: Sure. So I guess I have two points. My first would be that data collection, we keep going back to it in this conversation-- that's key. We just commissioned and issued what's called the Marijuana Data Gap and Analysis Report which shows what we know, what we know we know, what we don't know, and we don't know we don't know. And figuring out those holes is key to figuring out what legalization means. And on a related note, I would say that Colorado can't do this alone, but we have to.

The federal government would normally be involved with dozens of aspects of regulating something like this. And that's from pesticides, to banking, to out of state diversion. Because our laws conflict with federal laws, we have to figure these problems out on our own. And I think we're doing a good job, but we don't have the resources that the federal government does. So the federal government is allowing this to take place in Colorado and Washington, and we're thankful for that.

But I think that considerations need to be made continually on please let us have banking, please let us conduct research on this, and please let our universities do that. So we are doing a good job, but the federal government is a lot bigger and got a lot more money and we could use their help.

SCOTT MALONE: No state is an island, other than Hawaii, I suppose.

SKYLER MCKINLEY: Right.

SCOTT MALONE: All right. And out to California and you, Igor.

IGOR GRANT: Yeah. So I'd like to close with a couple of points. One is to reinforce what Governor Doyle said, let's separate the medical discussion from the broader issue of social policy and legalization. Secondly, let's get past the idea that there is no evidence whatever that these compounds have any medical value and that picks up on what Jeffrey was saying about scheduling.

Scheduling means at the moment marijuana resides with heroin and other terribly dangerous drugs with the additional statement that it has no medical value. That's just not true. And so the rescheduling is important. I would reinforce that it will permit research. Third, echoing what was said before, the larger scale trials that really need to be done in order to inform policy-- policy should be informed by data, I would argue, rather than by faith-- so the federal government needs to be involved in supporting these trials through NIH and other processes.

And fourth, I would say that to the extent that marijuana or cannabinoids have

medical benefit, they should be dispensed and treated like other medicines. We would not go to a flea market or a farmer's market to buy penicillin. We wouldn't know what was in there. And similarly since these are medicine, they should be dispensed by pharmacies or some other means that are well regulated where the patients know really what they're getting and doctors know what their prescribing.

So my final point would be, let's have less heat and more light on this topic or let's blow less smoke and get into the clean.

SCOTT MALONE: I'm not even going to try to top that as a closing line. I'm just going to leave that with you. And with that I'm afraid to say our forum has come to an end. But you can continue the conversation on forumHSPS.org, that's Harvard School of Public Health. And I hope you'll join the forum for the next live webcast also in collaboration with Reuters on November 7th on the 2014 elections and health reform. And that will be on November 7 at 12:30 PM Eastern. Thank you.

[APPLAUSE]

[MUSIC PLAYING]