

Chairwoman Anielski, Vice-Chair Hambley, Ranking Member Holmes and members of the House State and Local Government Committee, Thank you for the opportunity to testify in opposition to House Bill 585, the gun-control bill by Representative Mike Henne and Governor Kasich. I would first like to thank you for giving me the time to speak and be heard on this bill. With that said, let me say I am perplexed by a society so willing to give their God given freedoms away. I spent 23 years in the U.S. Army serving my country fighting for your Freedom and now I am seeing a trend of people wanting to voluntarily surrender their freedom which is alarming to not just to me but other freedom loving Americans.

However, perhaps the most egregious part of HB585 is the destruction of due process via “ex parte” hearings and even the emergency protection orders themselves. America was founded on the fundamental jurisprudence doctrines of “innocent until proven guilty” and due process. This bill infringes upon those doctrines when it infringes on our 1st, 2nd, 4th, 5th, 6th and 14th Amendment rights. Let me also point out that gun owners in states with an ERPO face the prospect of having their guns and gun rights removed at the behest of an estranged wife, angry relative or vengeful police officer. What are the odds? Think about this . . . What judge is going to say “no” to someone filing for an ERPO (especially if it’s a cop)? What judge wants to be “that guy”? The robed official who denied an ERPO in a case when the subject of the failed order went on to commit suicide, murder or mass murder? Better safe than sorry. Better your gun rights than his or her career. There are current laws already on the books and more laws will not fix the problem we are having in today’s society. I would like to point out society’s corrupt moral values. Legalization of mind altering drugs such as marijuana which does nothing but to corrupt family values and cause mental issues in today’s youth. (article enclosed)

(<http://www.apa.org/monitor/2015/11/marijuana-brain.aspx> ). Also the removal of God from our school systems has had impact on our beliefs, values and morals in today’s youth. (<https://billygraham.org/story/taking-god-out-of-school/>)(article enclosed) Also broken are the family support systems in today’s society. Until society admits that children from single-family homes are at risk from everything from drug use to promiscuity to violent tendencies, the deadly violence will continue. We must admit that in the U.S. we have created a welfare

system that devalues the nuclear family, where the father and mother are married and employed and work hard to afford a home for their children. Instead, we reward and encourage women and men to have multiple children outside marriage, and what follow are single parent homes that fail children. Our new system of co-dependency overwhelmingly encourages children to play violent video games and watch sex-filled violent movies. Until Society admits this, this country will continue to see crazed, lone wolf maniacs use guns, cars, explosives or rocks dropped from overpasses onto unsuspecting drivers. And the media are complicit. If it bleeds it leads. Make no mistake. The media did not create this problem. Society just made it worse. And politicians will say the same thing. We didn't create this problem. And movie producers and video game developers will echo the same message; we didn't do this! We are just providing what our customers want, what they will pay for, what they need. That is just absurd. That's the same argument made by big tobacco two decades ago. It's not our fault customers and consumers are abusing our product. Public opinion turned and so did the tide of legislative measures. Big tobacco was sued and fined and is now slowly going out of business. Guns are not the problem in mass shootings. Even at Columbine, the evil teenaged perpetrators had propane bombs with them. Taliban and ISIS fighters have begun to use vehicles to mow down innocent people on sidewalks. Even if society bans them, bad guys with killing and mayhem on their minds, will come up with a way to carry out their crimes without guns. I believe private citizens with guns prevent and stop more of these evil acts than ever are reported. The liberal left agenda doesn't want to acknowledge or let you know that in cities where more citizens are armed, there are fewer of these cowardly acts. Technology is more to blame than people who lawfully own guns. Violent video games didn't exist three decades ago. Kiddos from single parent homes, who go home and spend time alone after school until an adult gets home, have hours and hours to spend watching violent television and cable shows. Kids are free to continuously play violent video games where using a gun to shoot people as a distraction from a hard home life. Yes, I am placing a lot of the blame for school shootings on violent video games. But it is big business. How in the world do teenagers know how to get hold of firearms and explosives to quell their raging hormones when bombarded by unrealistic social media demands (cyber

bullying)? If he can't handle it, he'll grab a gun and start shooting, just like he would in that first-person shooter video game. Except in the video game, as opposed to in real life, there are no consequences. Society created this debacle. Society turned their backs on children from broken homes by throwing money at their single parents. Society is promoting a welfare system where they only matter as long as they increase the need for more welfare spending. The cycle continues; we have to spend more on welfare because we've created an environment where single parents are rewarded financially to have more children out of wedlock. Then we ignore those children by setting them in front of a TV with a video game where the object is to kill as many people as they can over and over again without consequences. Why do we as a society wonder why every once in a while one of those neglected kids goes off the rails and actually kills other people at a most familiar environment: a public school? All the blame lies with today's society. Guns are not the problem. Today's society is the problem. And until today's society faces the ugly truth that society enable troubled individuals to commit mass killings by turning a blind eye to a social environment society created, and continues to support and perpetuate, We as a society will again and again witness these senseless, heartbreaking tragedies.

Here is a breakdown of HB 585. Let me start with.

RC 2923.11 (Weapons control definitions):

Bill Provisions:

Lines 1338-42 have no practical effect other than to mirror the federal definition of a "machine gun." The federal definition of a "machine gun" is found in 26 USC 5845(b):

The term "machine gun" means any weapon which shoots, is designed to shoot, or can be readily restored to shoot, automatically more than one shot, without manual reloading, by a single function of the trigger. The term shall also include the frame or receiver of any such weapon, any part designed and intended solely and exclusively, or combination of parts designed and intended, for use in converting a weapon into a machinegun, and any combination of parts from

which a machinegun can be assembled if such parts are in the possession or under the control of a person.

Lines 1344-47, however, have not been changed to reflect the federal definition of a "sawed-off firearm."

Comment:

Oppose Lines 1338-42 because the Bill attempts to mirror federal law on the definition of a "machine gun," but has not done so with regard to a "sawed-off firearm." Such selectivity reveals the arbitrary nature of this provision.

2) RC 2923.11 (Weapons control definitions):

Bill Provisions:

Lines 1394-96 add a new definition for "armor piercing ammunition."

The federal definition of "armor piercing ammunition" is contained within 18 USC 921(a) (17) (B):

The term "armor piercing ammunition" means—

- (i) a projectile or projectile core which may be used in a handgun and which is constructed entirely (excluding the presence of traces of other substances) from one or a combination of tungsten alloys, steel, iron, brass, bronze, beryllium copper, or depleted uranium; or
- (ii) (ii) A full jacketed projectile larger than .22 calibers designed and intended for use in a handgun and whose jacket has a weight of more than 25 percent of the total weight of the projectile.

Comment:

Said provision will allow state authorities to enforce the corresponding aspect of federal law. The assumption is that Ohioans can't purchase this ammunition anyway. But this also could open a door to ban other types of ammunition which would infringe on our right to keep and bear arms.

### 3) RC 2923.13 (Having weapons while under disability):

#### Bill Provisions:

Lines 1498-99 are deleted to correspond with repealing RC 2923.14 (Relief from weapons disability);

Lines 1504, 1507 expand the scope of firearms-disabled persons in Ohio to include any person convicted of ANY felony; and

Lines 1508-15 are removed because they are redundant after expanding scope of this Section to ANY felony.

#### Comment:

Strongly objections to the above referenced line items. These provisions would apply retroactively, making thousands of Ohioans disabled from possessing firearms overnight with the stroke of a pen. This law is fundamentally unfair on many levels.

The Second Amendment is a fundamental right guaranteed by the U.S. Constitution, and courts have generally applied strict scrutiny where a law substantially burdens core Second Amendment activity. (See Sarah S. Herman, Post-Heller Second Amendment Jurisprudence, Congressional Research Service (Nov. 21, 2017)). For a law to pass constitutional muster under strict scrutiny, the State of Ohio would have to show that the law serves a compelling government interest and is narrowly tailored to achieve that interest.

Expanding the scope to include ALL felonies would necessarily include crimes such as the following (this list is non-exhaustive):

RC 2913.02 Theft: if total of items stolen is over \$1000

RC 2907.09 Public indecency

RC 2915.02 Gambling

RC 2921.31 Obstructing official business

RC 2921.02 Bribery

RC 2921.11 Perjury

Comment:

While this type of conduct is certainly not commendable, it is absolutely absurd to believe that individuals convicted of the above listed crimes (among all other newly expanded crimes) are a risk to the public with respect to firearms. Thus, there is no compelling state interest (risk to public) that is narrowly tailored to achieve the intended result.

Further, this law would place a state, firearms disqualification on non-violent, non-drug dependent individuals with ANY felony conviction from protecting themselves, or their family, even inside their own home. The practical manner in which Ohio law is set up, if a firearms-disabled person lives in a residence with other family members, children, etc., there cannot be a firearm in the residence without subjecting said individual to criminal liability. Thus, this law would affect everyone in a household where anyone convicted of a felony resides. Firearms are, in many instances, the only effective way to defend one's home from intruders or perpetrators in our present day and age. This law would effectively limit an entire new class of individuals to the bleak prospect of bringing a knife to a gun fight if they ever needed to defend themselves, or their loved ones, from death or great bodily harm.

Bill Provisions:

Lines 1530--31 further expand the scope of firearms disabled persons under Ohio law to include a person who has been discharged from the armed forces under dishonorable conditions. Understanding is that dishonorable discharge may include, without limitation, being court-martials for the following:

AWOL – A service member who is absent without Official Leave (“AWOL”) may be dishonorably discharged. To be considered AWOL, the individual must have intentionally left his or her post, or fail to return.

Comment:

Again, the State of Ohio cannot show how this law is narrowly tailored to address a compelling need of the government, i.e. risk to the public. How are dishonorably discharged persons that have been court-martialed for AWOL a risk to the public?

Bill Provisions:

Lines 1537-40; 1551-70 concern provisions with "extreme risk protection orders."

Comment: : people who are not alleged to have committed a crime should not be subject to severe deprivations of liberty interests, and deprivations for lengthy periods of time, in the absence of a clear, compelling and immediate showing of need. Granting an ERPO is cause for great concern. Gun violence is a deeply serious problem, but not, Minority Report-like, at the expense of basic due process for individuals whose crimes are speculative, not real. The precedent it creates could reverberate in unexpected and distressing ways in years to come.

4) RC 2923.20 (Unlawful transactions in weapons):

Bill Provisions:

Lines 1683-89 prohibit persons from ANY purchasing of a firearm, not a bona fide gift, for a third party, regardless of whether or not the third party is lawfully allowed to possess a firearm.

Comment: This law is concerning for a number of reasons. One reason, immediately apparent, is the purchase of a firearm for an individual who is physically disabled or suffering from some illness that cannot physically go to a FFL. In short, this law is not narrowly tailored to achieve a legitimate government interest.

Bill Provisions:

5) RC 2923.14 (Relief from weapons disability):

Bill Provisions:

This Bill intends to repeal the entire code section of RC 2923.14.

If the Bill were to pass, not only would ANY felony lead to a state firearms disqualification, but there would be no mechanism to be relieved from Ohio firearms disqualification.

Other fundamental rights, such as the right to vote, are automatically restored under Ohio law upon final disposition of a felony sentence. The right to possess a firearm is a fundamental right secured by the U.S. Constitution (See District of Columbia v. Heller; McDonald v. City of Chicago) as well as the Ohio Constitution. Studies have shown that the restoration of civil liberties (such as the right to vote) upon completion of a felony sentence is correlated with decreased recidivism.

Under the same vein, the concept of rehabilitation, which is a fundamental pillar of criminal justice, presumes that individuals who have made past mistakes and committed crimes, can be effectively rehabilitated and not pose an ongoing risk to the public. RC 2923.14 gives courts in Ohio discretion to allow certain individuals to possess firearms, provided said individuals meet certain stringent requirements. I object to the stripping of judicial discretion in this fashion.

If we, as a society, truly believe in the concept of rehabilitation as a fundamental precept of criminal justice (and we should), there has to be some avenue for a person to restore all fundamental rights guaranteed by our Constitutions. Consider also that the right of self-defense is a natural, God-given right that predates our constitution. We are going astray with this Bill.

Individuals, who have committed a firearms-disqualifying offense, at some time in the past, should have some mechanism to apply for relief from weapons disability because: 1) they have paid their debt to society; and 2) there should be some foreseeable and achievable end to punishment. This concept regarding the finality of punishment and penal rehabilitation serves the ends of criminal justice and is congruent with the founding principles of our great country.

6) RC 2923.23 (Voluntary surrender of firearms and dangerous ordnance):

Bill Provisions:

Lines 1755-61 remove the exception for prosecution under RC 2923.13 regarding evidence obtained in connection with an application to be relieved under RC 2923.14. Comment:

Strong objections under the same principals as stated in No. 5 above.

7) Proposed Sections of the Ohio Revised Code, RC 3113.26 through 3113.30:

Bill Provisions:

Lines 1767-2392 provide for laws that allow court to issue an "extreme risk protection order." (EX PARTE)

Comments: violating due process which is protected by the 1<sup>st</sup>, 2<sup>nd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> and 14<sup>th</sup> amendments

1<sup>st</sup> amendment-Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.

**Gun violence restraining orders could implicate the First Amendment, as the orders could be used to strip a person of their rights based on speech. First Amendment concerns because they could target people based on speech, including statements on social media.**

2<sup>nd</sup> amendment-A well regulated Militia, being necessary to the security of a Free State, the right of the people to keep and bear Arms, shall not be infringed.  
**Confiscating firearms without due process infringes your right to keep and bear arms.**

. 4<sup>th</sup> amendment-The right of the people to be secure in their persons, houses, papers, and effects, **against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.**

5<sup>th</sup> amendment- No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the Militia, when in actual service in time of War or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; **nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law**; nor shall private property be taken for public use, without just compensation.

6<sup>th</sup> amendment- In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and **to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him**; to have compulsory process for obtaining witnesses in his favor, and to have the Assistance of Counsel for his defense.

**EX PARTE is a troubling due to the issue that an estranged marriage partner or a family member who has a disagreement with you could unjustly accuse you.**

. 14<sup>th</sup> amendment- **No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.**

**This legislation will not increase public safety. Rather, it will only further embolden the criminal class.**

**Please publicly oppose it, block it in committee and vote NO at every opportunity.**

**Thank you.**

**YOURS SINCERELY,**

**JEFFREY R HOPTON**

**U.S. ARMY RETIRED**

## **Billy Graham Evangelistic Association**

### **Taking God Out of School**

**America at the Crossroads is a series of articles that examines aspects of American culture that are of concern to people of faith.**

**For a high school student in small-town Texas, it doesn't get much better than Friday Nights.**

**It's one of those rare instances where the attendance at a high school football game can exceed the city's population limits.**

**NBC even made a TV series about the phenomenon called "Friday Night Lights."**

**But under those lights in Kountz, Texas, a town of about 2,000 less than 90 miles northeast of Houston, controversy has swirled.**

**And it turns out someone wants badly to snuff out the Kountz High School cheerleaders' Light.**

**A law suit has been filed — and trial set for June 24 of next year — in an effort to ban all Bible verses and religious sayings from posters and banners at Kountz High School.**

**The school officials caved under pressure after cheerleaders used scripture like Romans 1:16, “I am not ashamed of the Gospel of Christ...” and Romans 8:31, “If God is for us, who can be against us,” to take a stand for God.**

**Freedom From Religion Foundation, a Wisconsin advocacy group that claims the messaging violates the First Amendment—once notified of these cheerleaders’ stand—were quickly dialing up their lawyers.**

**But District Judge Steve Thomas granted an injunction that will allow the religious-themed banners to be displayed, pending the outcome of next summer’s trial.**

**A momentary win for keeping God in public schools, although the outcome is still TBD.**

**“Anyone who is expressing their faith should be celebrated, from my perspective, in this day and age of instant gratification, this ‘me-first’ culture that we see all too often,” Texas Gov. Rick Perry told the Associated Press.**

**“We’re a nation built on the concept of free expression of ideas. We’re also a culture built on the concept that the original law is God’s law, outlined in the Ten Commandments.”**

**Separation of Church and State?**

**If you want to catch someone off balance with a trivia question, ask them if the phrase “Separation of Church and State” appears in the U.S. Constitution. Then ask them if it appears in the First Amendment.**

**Both answers are no.**

**Although in 1947 language was added in the First Amendment to allude to the “Separation,” that term doesn’t exist today.**

**In fact, most scholars trace the phrase “Separation of Church and State” to a letter written by President Thomas Jefferson in 1802 to the Baptists from Danbury, Connecticut. It was picked up by a Massachusetts newspaper.**

**But that hasn’t stopped anti-religious freedom groups from hammering the public school system across this country. Here’s just a sampling of how God is being pushed out of the classroom and school buildings across this country—all examples from the last eight months:**

**Jackson, Miss: The ACLU has asked West Lincoln Attendance Center to stop prayer at school functions by Oct. 26 or face a possible lawsuit.**

**New York City: Michelle Schindelheim, 47, an English as a Second Language teacher at Bronx Middle School 301, was disciplined this week after she admitted to having her students pray to Jesus and sit in a circle and sing.**

**Poteet, Texas: A 99-year tradition to pray both before and after a high school graduation ceremony ended in May after the valedictorian — an atheist — complained, a pro-separation group intervened and applied legal pressure.**

**Bellingham, Mass: Stall Brook Elementary School decided to change the words to Lee Greenwood's "God Bless the USA" to "We Love the USA," at a pep assembly in April. But after parents complained, the song was taken out altogether, then re-inserted after media onslaught.**

**Boston: A family sued to take the words "under God" out of the Pledge of Allegiance in February.**

### **'A Whole Different Worldview'**

**Gigi Savant has been teaching since the mid-'80s. She's been in both public high schools and Christian schools, and she certainly does not like what she's seeing in the public sector.**

**"Our nation was founded on Christian values of what's right and what's wrong, founded on the Ten Commandments," Savant said. "But if you remove the basis of scripture, it's everything. It's our world view. And it has cataclysmic results."**

**Savant currently teaches at a Lakeland, Fla., school, where Classical Christian curriculum is being taught. "We stress goodness, truth and beauty," she said. "In public education, there is no standard of truth."**

**Well, there is one standard, but it's nowhere to be found in the public arena.**

**“The Bible teaches there is truth. Jesus is the truth, the way and the life,” Savant said. “Truth really is a person, the person of Jesus. When you remove the Bible as your standard, what becomes truth?”**

**Some of the practical ways she has seen God — and morality in general — being stripped from the halls of a public high school, include policies that make giving a simple Tylenol to a student require a note from the parent, while the same nurse can help the same child get an abortion with no parental involvement needed.**

**“I remember on the radio about 10 years ago debating when is it OK for a teenager to be involved in sexual activity,” she said. “Well, definitely by the time they're 18 is fine, they said. And 16 is probably OK. Well, what about 14? Well, 14 is too young.**

**“But it's all arbitrary. Who's to say what's right and wrong? Cultural norms will change.”**

**The future, as it pertains to public education, does not seem very bright to this veteran teacher. She hasn't taught in the public classroom for years, but she has many friends who currently do and she hears the stories and contrasts them with what's going on at her school.**

**“In a Christian situation, when a child comes into my classroom, Lord willing, I don’t see him as a person to be controlled,” she said. “He’s a child made in the image of God. As a Christian teacher, my whole purpose is to bring out the gifts and abilities, to reflect God’s character.”**

**Any chance of this teaching style becoming widespread in our country?**

**Savant pauses, trying not to laugh at the question:**

**“It’s a whole different worldview. Can you learn math and science? Yes you can learn that. Can you learn a value-based education? Get to the heart of the matter? I don’t see how you can reclaim that in the public schools, barring a movement of God in our country.”**

**American Psychological Association**

**Marijuana and the developing brain**

**More states are legalizing marijuana, but concerns remain about its long-term effects on the adolescent brain.**

**By Kirsten Weir**

**November 2015, Vol 46, No. 10**

**Print version: page 48**

**More states are legalizing marijuana, but concerns remain about its longterm**

**Marijuana is the most widely used illicit drug in the United States — but the term "illicit" may not apply much longer. Twenty-three states have legalized Cannabis sativa for medical use since 1996. Alaska, Colorado, Oregon, Washington and Washington, D.C., now allow recreational use of the drug for people over 21. Acceptance of marijuana is growing (ahem) like a weed.**

Those laws are not without controversy. Among the critics' concerns is the worry that, despite age limits, legalization might make marijuana more accessible to young people. And adolescents' developing brains may be particularly vulnerable to lasting damage from the drug.

"There are a lot of open questions" about the long-term effects of marijuana, says Susan Weiss, PhD, director of the division of extramural research at the National Institute on Drug Abuse (NIDA). "But there's a growing literature, and it's all pointing in the same direction: Starting young and using frequently may disrupt brain development."

### Brain under construction

Marijuana shows considerable promise for treating medical conditions including pain, muscle spasms, seizure disorders and nausea from cancer chemotherapy. At least some of those benefits are thought to come from cannabidiol, a chemical component of the marijuana plant not thought to produce mind-altering effects. But there's a lot left to learn about this and other chemical compounds in marijuana. Recently, the Senate recommended \$800,000 for an Institute of Medicine study on medical marijuana, and has also encouraged the National Institutes of Health to support more research on cannabidiol.

What's clear, however, is that marijuana's signature high comes from a psychoactive component known as tetrahydrocannabinol (THC). And evidence is mounting, says Weiss, that THC is not risk-free.

**In the short term, marijuana use has been shown to impair functions such as attention, memory, learning and decision-making. Those effects can last for days after the high wears off. Heavy marijuana use in adolescence or early adulthood has been associated with a dismal set of life outcomes including poor school performance, higher dropout rates, increased welfare dependence, greater unemployment and lower life satisfaction.**

**But it's not clear that marijuana deserves the bulk of the blame. Some researchers have suggested that factors such as peer influence, emotional distress or a tendency toward problem behavior could predispose people to drug use as well as poor life outcomes. "Is marijuana the causal agent in these outcomes, or is it part of a variety of vulnerability factors?" Weiss asks.**

**Few longitudinal studies have been conducted to follow the trajectories of young people before and after they take their first hit of marijuana. But one long-term prospective study from New Zealand showed worrisome findings.**

**Duke University psychologist Terrie Moffitt, PhD, and colleagues collected data from the Dunedin Multidisciplinary Health and Development Study, longitudinal research that has followed 1,000 New Zealanders born in 1972. Participants answered questions about marijuana use at 18, 21, 26, 32 and 38. They also underwent neuropsychological testing at ages 13 and 38.**

**The team found that persistent marijuana use was linked to a decline in IQ, even after the researchers controlled for educational differences. The most persistent users — those who reported using the drug in three or more waves of the study — experienced a drop in neuropsychological functioning equivalent to about six IQ points (PNAS, 2012). "That's in the same realm as what you'd see with lead exposure," says Weiss. "It's not a trifle."**

**There are some reasons to think that adolescents may be uniquely susceptible to lasting damage from marijuana use. At least until the early or mid-20s, "the brain is still under construction," says Staci Gruber, PhD, a neuroscientist and director of the Cognitive and Clinical Neuroimaging Core and the Marijuana Investigations for Neuroscientific Discovery (MIND) Program at McLean Hospital/Harvard Medical School. During this period of neurodevelopment, the brain is thought to be particularly sensitive to damage from drug exposure. And the frontal cortex — the region critical to planning, judgment, decision-making and personality — is one of the last areas to fully develop, Gruber says.**

**Also immature in teens is the endocannabinoid system. As its name implies, this system comprises the physiological mechanisms that respond to THC. That system is important for cognition, neurodevelopment, stress response and emotional control, and it helps to modulate other major neurotransmitter systems, says Krista Lisdahl, PhD, director of the Brain Imaging and Neuropsychology Laboratory at the University of Wisconsin, Milwaukee.**

**Repeated exposure to marijuana can dial down cellular activity in the endocannabinoid system. Such interference might be a bigger problem for immature brains, says Lisdahl. "That sets the stage for why adolescents may be more sensitive to the effects of repeated marijuana exposure, from a neuroscience perspective."**

### **Altered brains**

**Indeed, a number of studies have found evidence of brain changes in teens and young adults who smoke marijuana. In 2013, Rocío Martín-Santos, MD, PhD, at**

the University of Barcelona, and colleagues reviewed 43 studies of chronic cannabis use and the brain. They found consistent evidence of both structural brain abnormalities and altered neural activity in marijuana users. Only eight of those studies focused on adolescents, but the findings from those studies suggested that both structural and functional brain changes emerge soon after adolescents start using the drug. Those changes may still be evident after a month of abstaining from the drug, the researchers reported (PLOS ONE, 2013).

Some of those brain abnormalities have been linked to cognitive differences. Gruber found that regular, heavy marijuana users — those who reported smoking five of the last seven days, and more than 2,500 times in their lives — had damage to their brains' white matter, which helps enable communication among neurons. Those white matter changes were correlated with higher impulsivity, she found, particularly in people who began smoking before age 16 (Psychopharmacology, 2013).

Much of Gruber's work compares heavy, regular marijuana users who began before and after age 16. Her results suggest there's greater risk in starting young. Compared with users who began after 16, early-onset smokers made twice as many mistakes on tests of executive function, which included planning, flexibility, abstract thinking and inhibition of inappropriate responses. As adults, those who started using before 16 reported smoking nearly 25 times per week, while those who started later smoked half as often, about 12 times per week. The early-onset smokers also reported smoking an average of nearly 15 grams each week, versus about 6 grams for their late-onset counterparts (Psychology of Addictive Behaviors, 2012).

Gruber's participants had reported using marijuana at least five times in the past week. But other labs have found structural differences in the brains of less frequent users. Jodi Gilman, PhD, at Massachusetts General Hospital/Harvard

**Center for Addiction Medicine, and colleagues used MRI to look for brain changes in 18- to 25-year-olds who smoked marijuana at least once per week, but were not dependent on the drug.**

**Compared with nonusers, the smokers had changes in the shape, volume and gray matter density of two brain regions associated with addiction: the nucleus accumbens (which plays a role in motivation, pleasure and reward processing) and the amygdala (a region involved in memory, emotion and decision-making). Participants who smoked more often had more significant differences (Journal of Neuroscience, 2014).**

### **Open questions**

**But the case against marijuana isn't closed. Other studies have failed to turn up evidence that marijuana use results in brain abnormalities. In one recent example, Barbara Weiland, PhD, at the University of Colorado at Boulder, and colleagues attempted to replicate Gilman's study in adolescents and adults who smoked marijuana daily. But Weiland's team argued that previous studies, including Gilman's, failed to adequately control for alcohol use by the participants. After carefully matching for alcohol intake in the control and experimental subjects, the researchers failed to find physical differences in the nucleus accumbens or the amygdala of daily marijuana smokers (Journal of Neuroscience, 2015).**

**On the other hand, says Lisdahl, Weiland's subjects were primarily male — and some research suggests females might be more sensitive to marijuana's effects during adolescence.**

**In other cases, too, the evidence against marijuana is frustratingly mixed. While some studies have found increased risk for mood disorders and psychotic symptoms among marijuana users, for instance, a new study by Jordan Bechtold, PhD, at the University of Pittsburgh Medical Center, and colleagues found that chronic use among teenage boys did not raise the risk of later depression, lung cancer, asthma or psychotic symptoms (Psychology of Addictive Behaviors, 2015).**

**In hopes of painting a clearer picture of marijuana's potential risks to youth, NIDA plans to launch the Adolescent Brain and Cognitive Development (ABCD) study later this year. The prospective longitudinal study will follow 10,000 individuals across the United States over a decade, starting when they're 9 or 10. "The idea is to look at what these kids are like before they start using substances, and then follow over time what happens to their brains," Weiss says.**

**Other important questions remain to be answered. Much of the research on the long-term cognitive effects of cannabis has focused on heavy users. It's not clear whether there's a safe level of use, Lisdahl says. Nor is it known whether the brain changes associated with marijuana use are permanent, or if the brain can recover with time. "A lot of people have used marijuana for a few years during adolescence," says Lisdahl. "Have they done damage that's irreversible?"**

**Finding answers to these questions may be complicated by the fact that marijuana potency has risen dramatically in recent years. Thirty years ago, THC concentrations were typically well below 10 percent, and even below 5 percent. But a recent analysis of marijuana samples sold in Colorado found THC potency approaching 30 percent, according to results presented at the 2015 meeting of the American Chemical Society.**

**New methods of administering the drug are also springing up, including smoking new varieties of highly concentrated cannabis resins, which contain even more THC than high-potency pot. Recently popular edible products — think marijuana gummy bears — also present problems. Users might not have a clear sense of what constitutes a reasonable "dose." And since edible products take longer to be metabolized and produce their psychoactive effects, people can easily overindulge while they're waiting for a high to kick in. "What's clearly lacking and sorely needed are studies that look at the effect of increased potency, and different modes and methods of use, on brain-related measures," Gruber says.**

### **Access and attitudes**

**Despite these questions, nearly half of U.S. states have already legalized marijuana in some form, and more are likely to follow suit. A number of researchers are now turning their attention to the question of how those laws might affect young people.**

**Esther K. Choo, MD, MPH, of Brown University, and colleagues used data on more than 11 million high school students from the Centers for Disease Control and Prevention's national Youth Risk Behavioral Surveillance Survey collected between 1991 and 2011. Marijuana use was common among the students — about one in five reported having smoked marijuana in the last month. But in states that legalized marijuana, the researchers found no increases in teen use following passage of the new laws (Journal of Adolescent Health, 2014).**

**In a similar study, Deborah Hasin, PhD, at Columbia University Medical Center, and colleagues analyzed survey data from more than one million adolescents**

collected between 1991 and 2014 as part of NIDA's Monitoring the Future survey. During that period, 21 states passed laws legalizing cannabis for medical purposes. Hasin and her colleagues found no apparent differences in marijuana use among adolescents before and after the medical marijuana laws were passed (The Lancet, 2015).

Yet Hasin and her colleagues did find that in states where medical marijuana was legal, teen marijuana use was already higher even before the laws were passed. That suggests more permissive attitudes toward marijuana in those states, rather than increased access to the drug, may influence teen use.

Indeed, the Monitoring the Future survey has shown that when perception of marijuana's risk drops, use of the drug rises in short order. And the perceived risk of marijuana has been declining over the last decade. In 2014, less than 40 percent of high school seniors said they believed regular marijuana use was very risky — the lowest proportion since the 1970s.

Other researchers are exploring how families interpret the new laws. W. Alex Mason, PhD, director of research at the National Institute for Child and Family Studies, Boys Town, and colleagues have studied parents' perceptions and knowledge of marijuana laws in Washington state. They found that parents often remained uncertain about what was legal or illegal, and only discussed the laws with their children occasionally. "Parents as a theme expressed frustration about not knowing the facts," Mason says. "In many cases, teenagers are following this more closely than their parents."

Parents may not be talking to their kids about marijuana often, but retailers seem to be, Lisdahl says. "In Colorado, there are marijuana ads in the free magazines that are clearly marketed to young people."

Unfortunately, marijuana producers have a strong incentive to hook young users. While about 9 percent of adults who use cannabis become addicted, the rate is 17 percent for people who start smoking in their teens, according to NIDA figures. And as the tobacco and alcohol industries have demonstrated, she says, such companies make the majority of their profits on a relatively small proportion of chronic users. "The minute there's a profit motive, companies tend to make a product more addictive," says Lisdahl. "I think legalization is moving ahead prematurely without considering the lessons we've learned from nicotine and alcohol prevention policy research."

Gruber, too, has concerns that marijuana policy is outpacing science. "As we're on the precipice of all this legislation," she says, "the take-home message is, there's a lot that we know, but a lot more we don't."

Much of the research on the long-term cognitive effects of cannabis has focused on heavy users. It's not clear whether there's a safe level of use. Nor is it known whether the brain changes associated with marijuana use are permanent, or if the brain can recover with time.

### Further reading

Jacobus, J., & Tapert, S. F. (2014). Effects of cannabis on the adolescent brain. *Current Pharmaceutical Design*, 20, 2186–2193.

Johnston, L. D., O'Malley, P. M., Miech, R. A., Bachman, J. G., & Schulenberg, J. E. (2015). Monitoring the Future national survey results on drug use: 1975–

**2014. Ann Arbor, MI: University of Michigan, Institute for Social Research.  
Retrieved from <http://www.monitoringthefuture.org/pubs/monographs/mtf-overview2014.pdf>.**

**Meier, M. H., Caspi, A., Ambler, A., Harrington, H., Houts, R., Keefe, R. S. E., . . .  
Moffitt, T. E. (2012). Persistent cannabis users show neuropsychological decline  
from childhood to midlife. *Proceedings of the National Academy of Sciences,  
USA, 109*, E2657–E2664.**