

# The Emerging Science of E-Cigarette Use and Nicotine Addiction

## Erin Boles-Welsh

Hello Everyone. Thank you for tuning into the fifth and final podcast in the 2016, 2017 TCN podcast series. This is Erin Boles-Welsh, Tobacco Control Program Manager for the Rhode Island Department of Health, and also the current TCN Chair Left. I'm joined by Dr. Jay Butler from the Alaska Department of Health and Social Services who currently served as ASTHO President, Dr. Brian King, from the CDC office on smoking and health, and Matthew Green from the Washington State Department of Health. We're excited to bring to you this podcast, the emerging science of E-cigarette use and nicotine addiction.

I would like to start off by introducing Dr. Jay Butler, who is joining us to discuss intersections between the use of e-cigarettes in his 2017 ASTHO President's challenge on addiction and substance misuse. Dr. Butler serves as the director of Public Health for the Alaska Department of Health and Social Services. He also serves as ASTHO President for the 2017 term, which affords Dr. Butler the opportunity to set this year's president's challenge in annual initiative of ASTHO to improve population health through the leadership of state and territorial public health officials and their agencies.

Dr. Butler, thank you so much for joining the TCN podcast.

## Dr. Jay Butler

Thank you for the opportunity to join you today on the podcast. MY name's Jay Butler. I'm Chief Medical Officer for the Alaska Department of Health and Social Services and Director of the Division of Public Health, and also the 2017 President of ASTHO. The 2017 ASTHO President's Challenge is public health approaches to preventing substance misuse and addiction. In part, this challenge is driven by the ongoing epidemic of opioid overdoses in our country. However, the challenge is much broader than that. It includes the whole scope of substances that can be misused and substances of addiction.

While nicotine is not one of the focuses of the challenge, there is a lot of overlap. I'll get to, in a moment, to why we're having the discussion on the podcast today. When we look at the scope of substances that are of public health is significant, certainly nicotine is as the top of the list. When we look at the death toll from tobacco use, particularly tobacco smoking, but we need to look at other substances of misuse and addiction as well, including legal substances, such as alcohol and marijuana. I want to start out by saying, while much of the focus in recent years has been on opioids, because of the rapid increase in overdose death, we continue, in the vast majority of our states, to see more tobacco and alcohol related deaths than opioid overdose deaths.

Marijuana is now legal in eight of our states, including my state. That is another substance with potential for dependency and addiction that we have to address. Of course, illicit substances are an important consideration as well. In addition, to illegal opioids, also stimulant such as methamphetamine, and the synthetic cannabinoids and cathinones. Therapeutic substances can be subject to misuse. Again, opioid pain killers seem to get most of the headlines, but stimulants, benzodiazepines, can play, and, benzodiazepines can play an important role as well.

Certainly, benzodiazepines also play a role in the opioid overdose epidemic, increasing the risk of fatal overdose. Across all three of these categories, legal substances, illicit substances, and therapeutic substances, there's emerging technology such as powdered alcohol, electronic cigarettes, and designer psychoactive drugs that we need to approach.

Why are we discussing these broad topics in the context of tobacco control? There's three important reasons. First of all, the fact that it's very psychoactive that among people with substances use disorders, that there is also tobacco addiction. It's estimated that as many as two thirds of persons with substance use disorders also use tobacco, and that proportion may be even higher among persons who are addicted to opioids. It really, I think, very sobering to realize that a little over half of persons who are in addiction treatment programs will ultimately die of tobacco related disease.

The second important factor is the emerging technology of electronic cigarettes. While these are sometimes called electronic nicotine delivery devices, it's important to realize that they can also be used to deliver a wide variety of psychoactive substances, including substances that are now legal in many states, including THC and other marijuana derivatives.

Third, speaking of marijuana, as medical marijuana becomes increasingly available and also retail recreational marijuana, it's presence is marijuana available to a number of our citizens. Now, up to about 20% of all Americans, we need to recognize the role that the policies that have been applied to tobacco smoking that will be helpful in determining marijuana policy as well.

To address these challenges, we have to all work together. Part of the strategic approach to developing and leveraging these public health approaches to prevent substance misuse, addictions, and the related consequences, includes five strategic strategies. One is to reduce the stigma and change social norms around addiction. Addictions are often times thought of as moral failings or just bad decision making, and sometimes bad decisions are what lead into addiction, but ultimately addiction is a chronic condition affecting the brain. We have to change the criminal justice approach to addictions and recognize that it is also a public health issues involving a health condition.

Second, we need to increase protective factors and reduce risk factors in communities. This includes understanding some of the factors that drive self-medication. Whether it's with alcohol, with opioids, stimulants, or with nicotine.

Third, we need to strengthen multi-sectoral collaboration, and that's where in government we

need to break out of our silos and recognize that we have a strong history in reducing tobacco use, and some of those same skills can be applied to addressing issues like alcohol and prescription drug misuse.

Fourth, we need to strengthen the prevention infrastructure. Whether that's at the local level or statewide in how we apply tobacco control policies and laws, we need the strength then to be able to approach this as a public health function.

Here in Alaska, many of our local public health functions are provided by the state through 22 public health centers, and in addressing the opioid epidemic, our public health centers are now involved in distribution of drug disposal bags, as well as, Narcan rescue kits.

Finally, an important strategy to optimize the use of crop sector data for decision making, we have robust infrastructure in assessing tobacco use, as well as the health impact of tobacco related disease, and we need to do the same as we approach many other types of addiction. I think, together we can continue to make progress in the public health efforts to reduce death and disease due to tobacco. My hope for some of the other addictive substance is that we can move faster.

As we think about the progress with tobacco, it's pretty gratifying to see the progress we've made in 50 years, but over 50 years, millions of people have died of tobacco related diseases, and it's my hope and my reason for speaking with you today, that we can not only build on the success of public health interventions in tobacco, but we can also move more rapidly to address the health threat from various types of substance misuse and addiction.

I thank you for the change to speak to you today and I look forward to talking to many of you in the future.

## **Erin Boles-Welsh**

Thank you, Dr. Butler, for your insights on how preventive measures for substance misuse and addictions can inform intervention and at reducing the use of e-cigarettes and other emerging tobacco products. Those who want to learn more about the 2017 President's Challenge can visit [www.astho.org/addictions](http://www.astho.org/addictions) and review the supplemental materials available on the TCN website along with this podcast.

Next, we're fortunate to hear from Dr. Brian King, who is the Deputy Director for Research Translation at the CDC office on smoking and health, where he provides scientific leadership and technical expertise in tobacco prevention and control. Brian was a contributing author to the 50th anniversary Surgeon General's Report on Smoking and Health, with the lead author of the CDC's 2014 Update to the Evidence Based State Guide Best Practices for Comprehensive Tobacco Control Programs, and was the senior associate editor of the 2016 Surgeon General's Report E-cigarette Use Among Youth and Young Adults.

Brian, the floor is yours.

## Dr. Brian King

Thank you Erin. I'm very pleased to be here to talk about the issue of the e-cigarettes and specifically whether these products are a public health promise or peril. There's been a lot of discourse over recent years about the potential impact of these products and whether they can be detrimental to population and individual health or whether there could be a net benefit.

Before I go into the specifics about the potential benefits and harms, first important to understand what the current landscape of these products looks like. This first slide really presents the different types of these cigarette products, and we have small mini e-cigarettes of disposable varieties where the user throws out the product after they deplete the liquid, all the way to mid-sized versions, which are frequently called hookah pens or vape pens, up to the larger mod systems or tanks, which are the type that you typically see at a vape shop.

It's really important to remember when we're talking about potential benefits and harms of what specific products people are using. We know that there's a rapidly diversifying landscape and new products enter the marketplace every day essentially. The bottom line here is that there are electronic products, so regardless of the different type of products, we do know that the anatomy is generally the same, and all these products due emit an aerosol to the use, which typically contains a variety of different things including nicotine, as well as flavorings and other additives.

In terms of the patterns of use of these products, among the US population, we have seen marked uptake among adults since we started monitoring this in 2010. For the most part, those increases have occurred among current and former cigarette smokers. We have seen some use among never cigarette smokers, but for the most part the decline, the increase and the use that we've seen among adults has been among current and former smokers.

Now, when we're talking about use, though, it's a different story. We have seen marked an exponential increases in use of e-cigarettes among youth since we started monitoring this behavior in 2011. We saw a marked up tip in 900% increase from 2011 up to 2015, and only recently, 2016 was the first year that we saw a decline in e-cigarettes use among youth. That's good news, that it shows that the public health interventions that we know work are helping to reduce use of this product, but we still have millions of youths that are using these products. This is very much a youth oriented issue in the United States where we have a four-fold higher rate among youth compared to adults, and so our evidence-based measures really are critical that we focus on young people because we know the youth use of any type of tobacco products is unsafe for their health.

Now, in terms of the potential benefits and harms, I'll start with benefits. This next slide really underscores the potential scenarios where there could be a potential benefit for e-cigarettes. The bottom line here is that only under certain circumstances. We know that e-cigarette aerosol doesn't contain nearly as a harmful number of chemicals as conventional cigarette smoke, so it's not 7,000 chemicals and 70 carcinogens like cigarette smoke, but that doesn't mean that it's risk free. We do know that the aerosol contained within these products does contain some harmful

and potentially harmful constituents. That being said, if an adult smoker were to transition completely to e-cigarettes, there could be a net public health benefit to the individual.

That being said, that's not necessarily what's happening in the current literature. We do see a lot of smokers continuing in what we call dual use. That's using both e-cigarettes and cigarettes, and this is a public health concern because in order to reap any potential benefits from these cigarettes, you have to quit completely, and smoking even a few cigarettes per day can still be problematic for health.

Currently, the evidence related to the efficacy of these cigarettes for cessation is inconclusive. We do know that there are several studies that have assessed this issues, using the same people over time, and the finding from those studies are mixed. Currently, the evidence is lacking in terms of recommending e-cigarettes for the purpose of cessation, and the US preventive services task force has concluded that the current evidence is insufficient as well. Although the science continues to evolve and hopefully we'll have more science in the coming years, currently these are not an evidence based method to successfully quit. The good news is that we do have seven FDA approved medications that have been shown to help people quit, and so we continue to encourage those as the science on e-cigarettes continues to evolve.

Now, in terms of potential harms, there're several to remember. This current slide presents the different scenarios of how e-cigarettes could be potentially harmful to the public. Those include things like leading to the initiation of combustible tobacco use. We do know that strictly among kids, e-cigarette is strongly associated with conventional cigarette smoking. Some studies have shown the kids who use these cigarettes are more likely to smoke regular cigarettes in the future, so this is a concern. We also have concerns about e-cigarettes leading to relapse among former smokers, as well as for the potential of these products to diminish the chances that smokers will actually quit, and discouraging them from using proven quit methods.

There's also some concerns about the aerosol emitted from these products. The US Surgeon General's Report in 2016 concluded that the aerosol was not harmless and can include potentially harmful ingredients, and there's also concerns about the glamorization of these products, as well as potential poisonings from users. In recent years, we've seen marked uptake on the calls to poison control centers as the results of exposure to these products.

In conclusion, we can say that there could be a theoretical potential benefit or harm from these products, but that depends on the patterns of use and how it impacts conventional cigarette smoking, and right now there are many inherent risks of these products, particularly to young people, and the benefits would only be reaped if adult smokers are able to use these products to quit completely, and currently, the scientific evidence on this is inconclusive in terms of the efficacy of these products for cessation.

In summary, we know that e-cigarettes are now the most commonly used tobacco products among youths. They're very prominently used, underscoring the importance of efforts to continue to monitor trends and to implement evidence based measures to interrupt that, and the bottom line here is youth use of any form of tobacco products is unsafe. Regardless of any

benefits, it could be reaped from adults. You should not be using these products, and in terms of the evidence on e-cigarettes for cessation, there is not currently an FDA approved quit aid and more science is needed on that matter.

We do know that some people are quitting using e-cigarettes anecdotally, but the plural of anecdote isn't data and we need to base our public health recommendations on sound science. It's also important to remember that e-cigarettes were not the first novel tobacco product to enter the landscape and they won't be the last, and so it's really important for us to continue to monitor the use of these products and any future variations of these products, and continue to update and modernize our tobacco control interventions to reduce all forms of tobacco related disease and death that is facing the American population.

## **Erin Boles-Welsh**

Thank you so much, Brian. That was an excellent summary of the rapidly changing landscape of e-cigarettes prevalence, and the concerns around youth use of the products. We appreciate your participation. I'd like to introduce our third and final speaker. Matthew Green. Matthew serves as the Senior Policy Analyst with the Division of Prevention in Community Health at the Washington State Department of Health. His professional experience includes writing water quality and natural resources policy for state government, managing political campaigns and lobbying the state legislature. He earned his Masters in public policy from the Kennedy School's government at Harvard University. Thanks so much, Matthew, for being part of the podcast.

## **Matthew Green**

Thank you Erin. I'm happy to be here. I was asked to join this podcast based on my experience, or Washington State's experience, I should say, in trying to pass legislation around vapor product regulation here and actually we finally did in the 2016 legislative session and we're in the process of implementing it right now, our new vapor product prevention and control program.

Everything I have to share here is primarily based on that experience and other issues, other times that we've talked to the legislature about tobacco we've made an issue using such, and a disclaimer, any commentary here is mine and not necessarily the department's.

First, in the big picture, as we approach legislators and probably the general public, the average legislator, in my experience, simply does not perceive nicotine addiction on its own, separate from tobacco smoke, to be a major problem. It doesn't strike the same chord as smoking as opioid addiction or meth, or even marijuana, which actually there's some evidence that they have less addictive qualities. Nicotine addiction outside of the cigarette smoke does not create that same instant sense of there's something unhealthy here. People just don't know that. It's sort of like cigarettes many years ago, even doctors were quoted as saying it's a healthy thing.

It's not that they think it's necessarily great for people to be addicted for nicotine, but it's not the worst thing in the world, in their view. This is what leaves open to the opportunity for the industry to talk about a safer cigarette, to talk about electronic cigarettes as a cessation device, because after all,

they've taken out all the bad stuff. The smoke, the carcinogens, and so on. Apparently, supposedly.

A big challenge that we have, right up front in doing anything, in this case in the legislature, is that education of decision makers. Brian laid out some of the scientific knowledge. The challenge then becomes translating that into messages that communicate to people effectively. We're still not all the way there on that issue, I think.

Again, this will be a common theme where tobacco was some years ago in terms of reaching the general public with powerful messages. Not just a statistic, but a story. A personal story. Something that invokes an emotional response based on the scientific facts, but not limited to dry statistics. Sometimes, often, in our material for legislators, we're stocked with dry statistic. Sort of all we had. In some cases, as Brian mentioned, inconclusive statistics. One thing I would love to have is very clear information on the cessation question about what exactly is the effect, or the usefulness of electronic cigarettes as a cessation tool. One way or the other.

Unfortunately, when our response to that question, and it's one of the first questions we get from a legislator, does this actually help people quit smoking? If our response is, "Well, the data is inconclusive," then we've lost the argument. That's something that we very much need to work on, as well as the, more information about the health impact of all the things that are not nicotine in electronic cigarettes, beyond poisoning, which is fairly obvious if somebody drinks an entire bottle of nicotine or entire bottle of vaping liquid, the various chemicals, even just the glycerin, which is supposedly, which claims to be generally safe to ingest, but that's ingesting it through the stomach, not inhaling it into the lungs every day.

There's gaps there that make it very difficult for us to communicate the messages. Now, that's something that we're doing the best we can at a local level, a state level, to try to overcome some of that other people with more scientific background or a communications expertise than us, we need help from. Then what, turning to what can we at the state level do in regards to a public health response to the increase in electronic cigarettes. It's strongly suggested here that we should not be treating electronic cigarettes as simply synonymous with cigarettes or an alternative to regular cigarettes. That said, in the end, the regulatory efforts and the public health response looks a whole heck of a lot like the tobacco response.

Once again, we are not as well developed in terms of public health efforts around these devices as we are with tobacco. We are where tobacco was some time ago. In a few big picture things for what we have tried to do in some cases we have not done, but ideally, we, Washington State, and other states would do, first, simply regulate the cells of electronic cigarettes. Bring them into a regulatory scheme. Not for the sake of regulation, but because it creates a tool. An enforcement tool around sales, things like sales to people who are underage, if the ingredients or something that are not allowed. Some kind of enforcement mechanism that also tells us who is selling them. We can reach out to them in advanced of enforcement with education for store owners and store clerks. The way we currently do right now with tobacco products.

As well as, it's actually a more effective enforcer mechanism. I've known many states, including us, before we passed a vapor product regulation law, it was a criminal offense to sell vapor products to

somebody under age 18. That, to my knowledge, no one was ever prosecuted because that's enormously impractical. The administrative regulatory scheme is a prerequisite of doing something effective in terms of regulating sales. They ought to be included in smoking bans. In Washington, they are not.

We have a very strong smoking in public places law. The legislature chose to not to add vapor products to that law. They did, however, allow local governments to do so or to otherwise regulate where somebody can vape. There are some research into state law, but it's not nearly as comprehensive.

Another thing, you notice that throughout this conversation I sometimes use the word vapor products. The reason that's in my head is that that's actually the language that's used in our statute. We chose that intentionally to be very broad. The definition includes, essentially, anything that could be used for vaping. Whether or not it has nicotine, whether or not it has other kinds of products in it. It could be all the parts smoked separately and together. This is more all-encompassing, for example, than the federal rule that went into effect a little while ago. It's attempt to cover everything. Especially as things are changing fast.

We do have a standard ID restriction for underage people. We have some rules on sampling. This is one way our, we differ from tobacco is that actually sampling is allowed. This conflicts partially with federal law, but federal doesn't address products that don't have nicotine, so effectively, in Washington State, people can sample in an adults only venue, to give our three samples of vapor products.

One thing that we often do not do in Washington, that should probably be done, is address marketing. There is not tobacco Master Settlement Agreement equivalent of vapor products, and so the kinds of advertising restrictions that exist for tobacco simply don't exist in the same way for vapor products. We haven't made up for that yet, and in particular, but we tried, we do not address flavors. I see flavors essentially as a marketing technique to market these products for young people. That's not in place yet in our law.

Other non-statutory things, we are very much working on youth prevention. We are trying to build youth prevention programs in much the same way as tobacco youth prevention work, in most cases look at health districts and to major organizations. Some of that money coming from the retail licenses, by the way of the regulations provide funding for that. Also, we need to ensure that the patient services are available, the kinds of quitlines and such that we provide for tobacco. We need to do explicitly include electronic cigarettes. We're not there yet. We're working in that direction. Things like labels and warnings, we have some labels in our scenario, in our regulations, but they're actually, they're scheduled to go to expire when the federal labeling rules take effect.

Finally, to constantly press back on claims that e-cigarettes are better than cigarettes. To not let that go unchallenged. I know just a few moments ago, talked about how our messaging is not as good as it needs to be ultimately, but we still have to do that. We still have to get that message out as best as we can. Folks to start gradually, putting that in the mind of decisions makers do not simply, instantly accept the claim that electronic cigarettes are they're fine, they're not really a problem. After all,

they're better than cigarettes.

Also, to point out that absolutely, kids should not be starting to use thee and that yes, the industry is in fact targeting them. That's something that comes as surprise. Some people who don't pay a lot of attention to tobacco issues, especially because there aren't cartoon characters for tobacco anymore and we dealt with that pretty much. When you start seeing cartoon characters or adds that make e-cigarettes look sexy or look cool, people aren't aware that, yes, obviously, that is very much targeted at you. That current users, whether its tobacco or cigarettes, should really quit and we need to make it possibly for them.

Finally, just to end with the message that the only really healthy thing to inhale is clean air. This will take probably a number of years to get that message through, an effort by a lot of different people in a lot of different places, until it becomes an understood assumption by both the general public and decision makers that, no, these cigarettes are not the same as cigarettes, but there are health issues that legitimately needs to be addressed through public health.

I will add links to this website to link to our vapor product statues and to our program if someone is looking for more information as well as contact information, if there's, you want to know more. Thank you very much for having me.

## **Erin Boles-Welsh**

Thank you, Matthew. Thanks for sharing your exactly in Washington State passing vapor product policy, for sharing your resources and offering considerations and takeaways for others moving forward with state based e-cigarettes regulation and policy making. This is certainly an area many of us are needing to navigate and we'll all have many more opportunities to gain all the information and insight and those states that are moving forward with this. Thank you very much.

That concludes this podcast and so I'd like to take this final opportunity to thank Dr. Jay Butler, Dr. Brian King, and Matthew Green for joining me today. As a reminder, you'll be able to find all of the podcasts in the 2016, 2017 podcast series and a host of other TCN resources by visiting the TCN website, [www.tobaccocontrolnetwork.org](http://www.tobaccocontrolnetwork.org), and clicking on the resources tab. Questions about the podcast series or any other features of the TCN website can be directed to the TCN inbox at [tcn@astho.org](mailto:tcn@astho.org). Thank you for listening and take care.