



Webinar transcript: Hookah and E-cigarettes

Presented by Dr. Mary Martinasek. Recorded on August 18, 2016. Updated 11/24/2017. Contact the Montana Asthma Control Program at asthmainfo@mt.gov for more information.

Montana Asthma Control Program (MACP): We're happy to have Dr. Martinasek today. She is an assistant professor and social marketer in the Public Health in the Department of Health Sciences and Human Performance at the University of Tampa. She has taught undergraduate courses in epidemiology, biostatistics, health promotion, and public health policy. Dr. Martinasek is also a registered respiratory therapist, a certified asthma educator, and a tobacco treatment specialist. Her dissertation and subsequent research has focused on understanding the psychosocial aspects of hookah smoking among college students. Currently, Dr. Martinasek and her research team are conducting research on the social and behavioral aspects of e-cigarettes among both college students and pregnant women.

So again, if you're just joining us, everyone's being muted on entry. Please use the chat box if you have any questions and we'll get to those as we have time at the end. I am going to find where Mary's on it, oh here you are, I'm going to turn you into the presenter Mary and then you can just hit the ground running!

Dr. Martinasek: Okay perfect, hello everyone and thank you for taking time out of your busy schedule for this presentation. It'll be just under an hour and hopefully we'll have time at the end for you to ask any questions that you have. I'd also like to thank the Montana Chronic Disease Prevention and Health Promotion Bureau for having me today. So, what I'm going to present is some basics of hookah smoking first and then we'll move into electronic cigarettes, and, I'll add to it some new information that we have that we've learned along the way either through my research or through research that has been published in the peer-reviewed journals. So just an overview this will be the outline of what we'll cover today again starting with just a basic background and then moving it to more of the effects and the research.

So, what we know about hookah smoking just from the literature alone is that it's been around for over 400 years, it's believed to have been originated in India and believed to be spread by the Muslims. It didn't really come to the United States until the late 1990s and the reason why this delay is because the tobacco that they smoked a long time ago was a very harsh tobacco and it wasn't until the late 1990s that they introduced this flavored tobacco and the tobacco that's used in the United States now primarily and predominantly is a flavored tobacco with glycerin, honey, and again really aromatic flavor. What we do know about it also is that it's very customary especially for a father to offer his son a smoke at a very young age and some of the research that we did the college students from the Middle East, eastern Mediterranean region like Syria and Lebanon began smoking at the age of five and have continued to smoke, it's part of their culture.

So, depending on where you're from or if you have patients or students or community members from Egypt or Saudi Arabia they may refer to the behavior of shisha, boory, or Goza, where most of us are

more familiar with hookah or water pipe tobacco smoking. In Africa, it's very commonly known as hookah as well as here in the United States, if you know people from this area that this we call the eastern Mediterranean region they call it narghile or argihle and narghile actually comes from a word that means coconut because they believe some of the original devices were made out of coconut shells. And then in Persia, Iran we they call it Quylan there. So, it's really important if you have a community population that is from these particular areas that on your intake sheets if you're at a hospital or a clinic that you try to include words or common terms to that particular population. In Albania, they call it Lula or Lulava so you can imagine doing literature reviews on this I put in a lot of search terms, hookah and water pipe and all sorts of things.

So how does the device actually work? One of the terms it's also called is Hubble Bubble and Hubble Bubble was derived from the way the device actually works. On the left you can see a picture of a single hose pipe and then a schematic on the right hand side, so the bowl is where they'd put the shisha or the tobacco is packed or placed and you can see a green arrow going down, so the air is basically drawn in from that mouthpiece, is drawn in from the air the room air down those blue arrows through the charcoal through the tobacco it bubbles in the water here at the bottom and then goes out into the smokers lungs. So, a typical cigarette when you go to take an inhalation is about 50 mls of air – but with a hookah to actually activate it is about 500 MLs or 500 CCS which is about a tidal volume.

So, the tobacco again I told you the olden cold type of tobacco is called chirac, a very harsh tobacco with no flavoring but currently it's called maassel or some people call it shisha, and this is kind of what it looks like. It's very sticky, again it's very aromatic because of all the fruit flavorings that that they put in it and as it's being smoked, many of the females, we find in our research, they like that because they don't smell like a cigarette they actually have sort of a fruity smell to them. If the packaging looks something like this, there's currently, there soon will be but currently not active regulation on packaging, and so there's a lot of mislabeling, such as it has no tar which I guess in a sense is true because until the product is, the tobacco is actually burned and produces smoke we don't necessarily have tar, but it leads the smoker to believe that it's really harm free.

This typical package like the apple martini that you see at the bottom costs at a local tobacco shop about three dollars and fifty cents to about four dollars and fifty cents and it would last about an hour and a half of shared smoking. So, this is a picture of the bowl and you can see the top left the bowl is packed with the moist tobacco and it is tobacco, so a lot of the students that we did research with really didn't realize that it had tobacco in it, they thought it was just honey and glycerin and fruit flavoring. The tobacco is packed in the bowl and then a piece of aluminum foil is placed over the top of the bowl and perforated with a toothpick or something sharp because again that air is drawn from the room and it has to get through this aluminum foil down that tube to the bubbling water and then on top of that aluminum foil is placed a piece of hardwood charcoal.

You can see the gentlemen in the top-left is lighting a piece of hardwood charcoal, hardwood charcoal is made specifically for the hookah devices. It's a round disc often and it comes directly from the



hardwood of a tree without any binders or additives, which we see in our charcoal briquette that we put on the grill, those actually have a lot of binders and additives to it. In my research students will use really whatever they can get their hands on whether it be the hardwood charcoal, charcoal briquette, the butane lighter, anything to get the product lit. A typical package of the charcoal costs about two dollars for ten pieces. Sometimes they'll put double the amount of charcoals on just to get it burning faster, and it's important for you to know that in the hookah bars the people who set it up, the hookah guys or hookah gal, they actually prime the pipe for you so they actually put their mouth on the mouthpiece or on a mouth tip and prime the device to get it going before they pass it on to the patron. What's come out new on the market is titanium coconut coals, we really don't know, we don't have any research in the peer-reviewed journals about this type of coconut coals but what we do know about charcoal in general is it produces high amounts of carbon monoxide and we also know it produces a lot of heavy metals. Maybe two years ago they had identified three heavy metals, arsenic, cobalt, and nickel, and now a study that came out a few weeks ago has listed an additional 12 heavy metals that are drawn into the lungs from the outside, from the charcoal. The concern here is that it's advertised as coconut so people may think that is actually a healthy alternative.

So, in most of the hookah bars there are single hose pipes like you see here on the left and the idea is you have your own mouthpiece and the mouthpiece is put on that tip when you go to take your inhalation, and then you pass the hose to the next person. In my research, I did observations in many, many hookah bars over the course of a year and really people don't take the mouthpieces even though they're offered to them, they typically just pass the mouthpiece around from person to person. Here is also a double hose pipe, we don't see those as much in the hookah bars but they're out there. Also, triple hose, quadruple hose, I've seen as many as six hose pipes, and really if you ask people why to do you do this behavior? The answer across the board is it's a social behavior, we're doing it because we want to get together with our friends. Some students say it helps to bring them out of their shell, they're fixated around the pipe so it kind of helps motivate them to be more social.

So, we were concerned about the potential of people who maybe never smoked cigarettes, would this lead to smoking cigarettes because it does have tobacco in it, which means it has nicotine and nicotine is that addictive component. Nicotine is biphasic meaning that it both helps to relax people and excite them so college students will tell you it's the best of both worlds, and so it does have nicotine in it. Well first we weren't as concerned because the device really wasn't so portable but now we're starting to see portable hookah pipes, and this one actually was made by Porsche and it fits directly in the cup holder of a Porsche or any car for that matter. It's extremely expensive, about six hundred or seven hundred US dollars. This is what it looks like, it works the same way it just looks more contemporary. There's also newer devices, this is made out of Switzerland, a very nouveau looking type of device. So, we're starting to see a lot of changes in the size and the structure of the devices making them really more portable. This one's rather interesting you just put a mask on so you really don't even use the mouthpiece and I guess you put the mask on your friends and multitask or whatever, interesting device. And this one was put online where you could actually learn how to make your own hookah pipe using an alcohol bottle which obviously would be a draw to young adults and youth. Portable hookahs are made in China and



they are now available, they've been on the internet, now they're available in a lot of different places. Again, a fanny pack type and we also have the sling pack and this is actually pretty popular because college students or students in general can just throw it on their shoulder and go around. They feel it looks cool and believe it or not that's one of the things we hear is that they smoke it and they feel like they look cool so similar to what we've seen with cigarette smoking.

So, you'll see e-hookah, so electronic hookah, and when I talk about e-cigarettes towards the end of this talk really everything I say about electronic cigarettes is true to e-hookah. They're just using the name hookah and flavorings that were common in the hookah, but really, it's the same thing.

Another product that's out for hookah is called hookah stones, shisha stones, and so these are actually little pebbles and there you can see that they're moist and they're mixed with honey, glycerin, and fruit flavorings, and what we know about glycerin is when it when it's heated it becomes a respiratory irritant and a class 2B carcinogen, so although it's not tobacco, it doesn't have nicotine in it so it doesn't have that addictive substance, it still is not harm-free.

In addition, it still has to burn, or bake if you will, by that charcoal so they still put the aluminum foil on the top and then the charcoal on top of the aluminum foil so it skirts a lot of legislation both, the shisha stones and the typical tobacco, because the tobacco is not burning itself and some of the verbiage and in policies and in wordings across the US say that, you know, smoking is burning tobacco. Well, in the case of hookah and shisha stones it's not burning it's baking because it's the charcoal that's actually burning. So, if you're at the point of starting to reword your, what the definition of smoking for your state is, you know, look at other policies and other verbiage that's out there. We do have an article out there where we summarize all of the states verbiage.

This is another product that's out, it's called hookah ice, and so these devices in the top left are basically filled with water and frozen and the idea is they're going to cool that smoke even more and make it more comfortable for the person inhaling and you see the gentleman he's got the hookah ice and it's attached to basically the end of this hose I'm guessing that it will require an even greater inhalation because it has a little bit longer distance to go through. Hookah is already a cooler smoke, it burns at about 250 degrees versus a cigarette that burns at about 900 degrees, and people say it is less harsh on the throat, and part of that reason is because it is burned at a lower temperature.

So that's a little bit about the device, we'll move into talking about concerns that we have based on the research and the literature that's been done. So obviously, I've circled buildings here, but salvia is a hallucinogen, it's being mixed with the shisha and utilized by young adults. I actually had a student who I had given a presentation to and she came up after the talk and said that her friend's father invited them over to smoke hookah and she wasn't so familiar with it, but he had mixed salvia with it and if you ever google it or YouTube it you'll see it's just, it's really scary stuff. It grows naturally but it is a hallucinogen. She said she hallucinated so bad that people didn't even look like people. We also have students, college students, declaring the uses of weed or marijuana with the hookah. They don't burn it by itself they mix it with the shisha obviously one to mask the smell, but also, they say it burns too fast.



We just produced an article, you know as a respiratory therapist and teaching smoking cessation classes I would have people come up to me and they'll say well I know cigarette smoking is bad for me but what about weed and I thought you know, I really don't know. I just completed a systematic review of the literature, so we basically pulled all the literature on what are the respiratory effects of inhalational marijuana? And that was just published in Respiratory Care if you want that information. In a nutshell, we know that marijuana does cause emphysematous blebs, in some of the reports it led to lung cancer, it has similar symptoms that asthmatics experience such as shortness of breath, wheezing and chest tightness, it alters pulmonary functions, and it's also a bronchodilator.

So, on the bottom right is synthetic marijuana and unfortunately, it's called synthetic marijuana when in fact it's really not man-made marijuana. It is your Spice, your Black Mamba, your Texas Gold, and it's primarily made underground in China. It's sprayed and laced with all sorts of chemicals, and the reason it's called synthetic marijuana is because it acts on the same receptors in the body as does marijuana. Scary stuff. And you know, I've given talks around the state of Florida and also recently in Texas was with respiratory therapists who said they'd seen many cases come into their ICU and end up on a ventilator because of the use of synthetic marijuana. It is also used in a hookah and I just want to make everyone aware of these more popular products that are out there.

So, what is the prevalence? This is a monitoring the future, kind of a difficult graph to see, but over the course of time if we look at all the products that are out there, clearly hookah across the age groups is increasing in prevalence and this, really, they only looked at the past few years, but in the state of Florida, in many states we collected data, and the state collected data, and we can see that that's an increasing trend. So much so that cigarette smoking is decreasing and hookah and electronic cigarette, the behavior is increasing. This study was done with college, collecting college data, so you can see a lot of students participated from many universities and they asked them two questions in particular. Ever used a water pipe or hookah, and that means even one or two puffs, so anyone's ever tried it, and across the board it was about 30.5, or on average was 30.5%, and then if you're a current smoker, that means you've smoked within the past thirty days, and that was 8.4%.

In studies that I've completed at a large University, about fifty thousand students in Tampa, the University of South Florida, we actually had ever used that was similar it was about thirty five percent and current use about fifteen percent. At the University of Tampa where I currently work I've conducted a survey twice with about 900 students participating and ours was sixty ever used and about thirty, thirty-five current use and people say well it must be because you have so many international students there, and the fact of the matter was when we looked at the data, which we did ask people not only their race/ethnicity, but also where they were from, and we found that the primary smokers were Caucasian female.

So, what is the lure? I mentioned already that one of the lures is that social utility, they, the hookah bars, are set up to really invite people to sit in a group. The couches are sometimes semicircle, they bring games there that are group games you can play with people, they have TV, they have band stands



that you can set up your instruments and play, so they really try to make it very, very social, very much like a bar scene, although they don't all serve alcohol. Some allow you to bring, in Tampa anyway, allow you to bring your big gulps in but the age for getting into these hookah bars is primarily about eighteen years of age. We have about 24 hookah bars in our County, so we're really trying to get to our legislators and educate them on what we found, they really don't have a solid sense of what hookah smoking is. So, we're taking baby steps in trying to get some policy change in our county.

In our data, we find that they say there really are a lot of positive outcomes that they get from hookah smoking. They say it helps them relax, which makes sense with the nicotine in it, that has that relaxation effect, it helps them pass the time, they say they're bored, they say they get this legal high out of it and this is the question that was asked on my survey was smoking hookah only using shisha not mixed with marijuana, so the high that they're getting is not from marijuana but actually the shisha itself I became very curious about it that's how I use the data, the study that we conducted.

It's also very reasonable, you can order a hookah online for about \$15, a small one, and as I talk about some of the heavy metals and the carcinogens that are in it, the smaller the device the more toxic it is. So, a \$15.00 up to \$500, I saw one that was shaped like the Eiffel Tower and it was about five hundred dollars, and really you know ordering online is not difficult and some of these, many teenagers and even younger than that have their own credit cards and they can easily select that they're 18 years of age. The shisha I mentioned was about 3.50 and the charcoal was about two dollars, but if you go into a hookah bar, I went in many of them as I mentioned previously, and for ten dollars, anywhere from 8 to 12, on average 10, you can smoke all night. So, one of the hookah bars I got there at 8 o'clock, of course nobody's there but me because the college kids don't get there till 11 o'clock, but I could have smoked from 8 p.m. until 3 or 4 a.m. for \$10 so a very low cost, and that is a draw for young adults and college students that have limited budgets.

We're seeing it in the media not unlike cigarettes way back and so the young adults and the youth see this as a behavior that's acceptable, especially because we have really limited messaging out there about the negative health effects. If you want to find it you've got to search the CDC, and young adults and college students and youth are not going to be doing that. Athletes are smoking hookah, and we've seen it way back you probably didn't even realize that Alice in Wonderland and in Star Wars that that was actually a hookah that they were smoking there. This is sort of an interesting picture, and this was the Addams Family and they're smoking hookah also, and you can see the smoke billowing off the top of this. I like to show this because it's really a good picture of really how it doesn't work, because the only secondhand smoke that's produced when you smoke hookah is that that is exhaled from the smoker's mouth, it doesn't billow smoke off of the top of a charcoal like this particular picture depicts. We're also finding a lot of parents are smoking with their kids because they perceive it as being a behavior that's acceptable.

We conducted a study a couple years ago where we had the college students interview their parents about hookah smoking and to be honest with you many of them thought it was the bomb from when



they were growing up in the sixties. They really didn't have a good sense of what the behavior was. This study was published in Respiratory Care at the beginning of this year, also, so again, parents are really not knowledgeable of the behavior and partaking in it themselves. But primarily is that social behavior is the opportunity they feel to get out and be with their friends, it's relaxing, it doesn't cost a lot of money, you can play games, you know play your instruments, blow bubbles, they have all sorts of events going on in the hookah bars.

So what do we know about the effects and the research on hookah smoking, so this picture is a lot and in a full PowerPoint it actually goes from slide to fly but let's just take it around with them. The water, the far left is the vase, it unscrews, it's typically a glass base and it's filled with cold water, again that helps to cool that note to that 250 degree what we found in our research is that's not what they put in it and if they do use water they'll add ice to it, they typically use alcohol, I've heard Red Bull, Kool-Aid, milk. Milk I thought was sort of interesting. So, anything to try to add to the flavor, adding the alcohol was to try to get some kind of effect from the alcohol.

The lungs below represent that it really does take an incredible lung volume to breathe in, to actually activate the device itself, I said 500 CC's. We know that there are 7,000 chemicals in a cigarette but with hookah it's relatively new so we don't have the data to support that but I imagine over time we're going to really start to see similar numbers in terms of the carcinogens, the cancer-causing agents, in terms of the pollutants, in terms of the chemicals that are in hookah.

The bottom picture is a depiction of infectious disease, we don't see that with cigarettes but when we start to pass mouthpieces from person to person it becomes a concern that there could be the spread of infectious disease. From the charcoal on the top right is, again, there are heavy metals emitted from the charcoal, we also have some peer-reviewed journal articles that have assessed really what else is in the charcoal. I mentioned carbon monoxide, the charcoal produces 95 percent of the carbon monoxide, and a myth that students have is that the water filters the carcinogens, nicotine, whatever, but it really doesn't. There's one study out that says it filters about 5 percent, which is really not a filtering effect, there is no filter in that hose per se it's an open hose, and again we know that there's nicotine in hookah.

So, the carbon monoxide, more and more cases are showing up in the literature, this is just one example from Clark and colleagues of 12 visits to the ER. One actually went to the hyperbaric chamber from high levels of carbon monoxide. I think it's important really that you know, we get a good history of their behavior too, students, and another article, got sent home from the ER and then came back a week later in the second return to the ER they actually got the history of hookah smoking and conducted the appropriate test, the carboxyhemoglobin, to assess their levels. So again, it's important not only in the intake but also to make sure we're using the correct device, it's not as simple pulse oximetry but rather a device that measures carbon monoxide specifically. The ambulances now carry a Rad-57 or pulse oximeter that will measure carbon monoxide specifically, especially from the fires and things that they go to.



We decided to go out and do a study, and we did this in Hillsborough County, we recruited 200 participants over the course of several weeks standing outside of a hookah bar. We used this exhaled carbon monoxide monitor, we also used the Rad-57. We measured their carbon monoxide levels, we measured their oxygen saturations, their heart rate. On average of the 200 patrons they were in the hookah bar about two hours, that's about the average time that they spend in there, and so the graph I'm getting ready to show you is from the least difference to the greatest difference. So here, the white bubbles are each of the 200 individuals prior to going into the hookah bar, so here's how many hookah bar patrons we assessed and this is their carbon monoxide level on the y-axis and so each corresponding red dot is that person's carbon monoxide level as they as exited the bar. So, for example this person here, this is their pre-carbon monoxide level and this is their post-carbon monoxide level. We measured in parts per million primarily because that's the way the device measures and exhale so let's just say ten parts per million if you divide that by five would give you an average of the carboxyhemoglobin level so about two percent on average going into the bar the carbon monoxide level was about six point five parts per million so it was really in the normal range for maybe someone who M with a light smoker or a nonsmoker on average but coming out of the bar the carbon monoxide level was 65 parts per million so very high levels of carbon monoxide. I had one student come up to me after at recently and she said she works in a hookah bar and she ended up in the ER from carbon monoxide toxicity, so it's a huge concern.

We then decided let's go into the bars with a device that measures the carbon monoxide in the air, so on the x-axis was the time that was spent in the bar, so about four hours in the bar, each line represents the level of carbon monoxide for those four hours. You can see for example this blue, they really shot up high and then the carbon monoxide levels dropped off. We believe that this when the hookah bars open the doors to sort of vent out some of the smoke because it really does get strong in there. My levels going in were zero and coming out were 13. So, they constantly are opening the doors to vent it out but what's important here is each color represents the bar. We went into 10 different bars for the four hours, this black line is running across, here's what's allowable by the Environmental Protection Agency. So, bars have carbon monoxide levels above what's allowable so even if you're going to a hookah bar maybe you're just thinking there's been some time with my friends but not partaking you're still exposing yourself to high levels of carbon monoxide which we know has over 200 times affinity for hemoglobin than does oxygen. We also had patrons come out very nauseated, so we were wondering if they're at the point of toxicity.

Alright, infectious diseases. So, there's a lot of reports out there that say that we've identified this, some say it's a possibility, Aspergillus is this one that was identified and Aspergillus grew in the water and when the smoker went to inhale that Aspergillus fungus ended up in their lung. So, there is a case of aspergillosis tuberculosis transmission, it's possible, but I've seen nothing in the literature of where they've actually tied it to hookah smoking, but with the passing of the mouthpieces if someone were to have it, yes, it is possible. It's also possible to get mononucleosis, it's possible to pass herpes, the flu, I mean it's possible for a lot of that. So, we decided well how bad is it? Let's go out and culture the pipe. So, we went out to ten hookah bars and with three petri dishes and a research plan to culture these all the same way. We went in, ordered a fruit flavored hookah, and then systematically went and cultured,



so we had cotton swabs and petri dishes, and we went inside the mouthpiece, we went inside the permanent piece where the middle arrow on the right is, and then we went into that the other side of the hose, and what we found were over fifty-two different species of bacteria. We were only looking at bacteria, we weren't looking at viruses, we weren't looking at fungus.

I'll just give you a snapshot, this is still ongoing, we took it down to the RNA level so we were able to take it to the national library and look at an identification match up to an accuracy of 95%, and just to share with you here, we identified bacteria *Pseudomonas*, we've identified staph aureus, many contagious bacteria in fact some of these bacteria were antibiotic resistant, and so the process we're still working on this research we submitted some preliminary data to Pediatrics for a supplement that I think everyone should look for coming out in November and it's on e-cigarettes and hookah and secondhand smoke. Mononucleosis is also possible, we don't have any reported cases. We do have reported cases of acute eosinophils pneumonia and three people, a 15-year-old, a 19-year-old, and a 26-year-old, they primarily just put them on steroids of course with steroids and only one of them ended up on a ventilator. Long-term effects, we know there's an association with kidney cancer, lung cancer, visually a lip carcinoma, so for those in the dental field I think it's important behavior to ask about an intake form. On our local community college, they take care of a lot of community individuals and they've added hookah to their intake sheet. So, what do we know about hookah? Well, we know that if we compare one hookah session which lasts about 45 minutes to one cigarette, that's our best comparison that we have at this point, the hookah contains 40 times more tar, 30 times more carcinogens, 2 times the nicotine, and a lot more carbon monoxide. So, we can't say it's a harm reduction, it's actually worse than cigarette smoking because you're really adding in all those heavy metals from the charcoal as well.

This study was done by Eisenberg and colleagues and it was looking at the blood nicotine level and so if you compare, that 45-minute session is similar to a person who smokes about a half a pack of cigarettes a day in terms of their blood nicotine level, so very high levels of nicotine. I always heard that three cigarettes in a lifetime starts to change your brain chemistry towards that addictive nature of the nicotine so hookah behavior, for those who've never smoked cigarette, does have the propensity to lead to cigarette smoking.

So, people ask me what about the tea leaves? So, some hookah bars have tea leaves in it, so if you look at tobacco on the left and the tea leaves on the right. This article by Shidaie and colleagues was produced in 2012 and they looked at the tea leaves, which do not contain tobacco so there is no nicotine and it doesn't have the addictive substance. However, you can see here it has higher levels of carbon monoxide from the charcoal primarily, and levels of a carcinogenic poly aromatic hydrocarbon formaldehyde, which is a carcinogen, and so it's not harm free by any means. I did try it in the hookah bars and it was less harsh on the throat but it's still smoke and really the bottom line is the education should be any time you're inhaling smoke or vapor that's not air it's likely not going to be good for you.



Okay so we're now going to move into electronic cigarettes and then we'll have time for questions at the end. So, electronic cigarettes obviously are populating all sorts of neighborhoods, it's a very lucrative business, and this is what a first-generation e-cigarette looked like. It actually lit up at the tip to simulate a cigarette and it was even shaped like a cigarette. The way these devices work, breaking into three parts, the bottom half is a lithium ion battery that could be rechargeable or it actually could be disposable, this particular one is a disposable one, most of the newer ones are rechargeable. In the center component is where basically the reaction occurs, if you will, to produce that vapor or that aerosol, and then the golden part is the cartridge that contains liquid nicotine. Nicotine comes directly from tobacco, okay, it is liquid nicotine, and the propellant is propylene glycol which becomes the class 2b carcinogen and/or glycerin and glycerin is a respiratory tract irritant.

It's sort of interesting when we look at these devices and we ask students about it and what we've seen with these young adults is that they like these devices because they get this throat hit and it's really as strong when the smoke or the vapor hits the back of your throat, it's very harsh on your throat, and that's actually what they like. The center device here as I mentioned produces a vapor, so when individuals use the e-cigarettes actions say they are vaping and not smoking, and this can skirt some of the signage, if you have no smoking allowed, well they'll say I'm not smoking I'm actually vaping.

Again, the first-generation type of device is on the top, and then they started to get bigger and bigger to the point where they became modifiable for method of delivery, and the bottom where you could actually put your own flavors and get the vials and you just reload yourself, you recharge them yourself. The device actually was patented back in the 50s but it wasn't popular then because we didn't know that smoking was bad for you and it really wasn't any better than, you know, going to be better than a cigarette but in the recent, probably the past 10-15 years, it was patented by a guy from China named Han Lik who's now a dual user, he uses both traditional cigarettes and an e-cigarette. And now the devices look more like other products that we've seen, cigars and pipes and some even look like little kid devices, they have cartoons on, really drawing our youth in, and it does have nicotine, so it does have that addictive substance in it.

The U.S. tobacco companies said yes, this is a market we should get into because it's very lucrative. So, Philip Morris, R.J. Reynolds, and Lorillard are the three largest, they have the three largest market shares here, now have their own devices they want. Morris, this is called IQOS and this is what the device looks like. R.J. Reynolds this is what their device looks like, I don't know if this was part of their marketing strategy but when you go into the market you sort of see this and to me coming from Florida looks like Mickey Mouse. And Lorillard produces, they actually bought out Blue for a multi-million-dollar deal, and Blue was the one that actually lights up at the end with a blue tip and this device, this particular pack is called the Social Blue in that if you're near someone who's also vaping the Blue then your pack will vibrate in hopes that you'll socialize and start to talk about the product. It also vibrates if you're close to a store that has the refillable units.



Businesses are soaring, stores are everywhere. I'm sure many of you have seen them in your neighborhoods or around as you're driving around. There are many unique flavors. You can see here's a lady, she's actually filling her own device with the liquid nicotine, so monitoring in the future again is no different. This is the best graph, but we see traditional cigarettes decreasing and electronic cigarette and hookah increasing. This is some data we collected, we had a sample size of over 700 students and we wanted to know have you ever smoked an electronic cigarette? So, the question was if you tried it even one or two puffs, and of those 700 and something about 348 students had tried it. We wanted to know more, so have you used a regular cigarette? So, here's yes and here's no. And so, we really see a pattern where to try the electronic cigarette they weren't current traditional cigarette users, they're really just trying it to see what it's about.

We asked them where'd you hear about it? Obviously, it's ubiquitous. It pops up everywhere, but primarily it's from a friend who smokes one and others said no one, just because it is everywhere, but primarily a friend. That's how they heard about it. And then we asked why did you start it, why did you decide to smoke it? And you can see here primarily because of friends smoking. The second highest was the "I smoked other products and wanted to try it," "it looks cool," which is sort of interesting, you think that at this point in our regulations with cigarettes and education that that wouldn't be a concern anymore but it's still there, "I'm trying to quit smoking regular cigarettes," and "just curious," they're curious. So yes, anecdotally we know people and there are studies out there that it has helped people to quit, we just can't support it as a smoking cessation aid until more research and regulation goes into the device.

We also asked them what sorts of experiences you have and the highest experience they have is coughing, I think primarily because of that throat hit, you can see throat burn, headache, and these were the experiences. Obviously, you can see by the number of people who participated there were many who didn't have a negative experience. We're seeing it accessible everywhere, it's a low price, so a person who smokes a traditional cigarette says they spend \$175 on average, where an electronic cigarette only costs them thirty-three dollars. The stars, it's everywhere, athletes, everyone is trying these devices. Some people to quit, some people just to use them, yes, they are not necessarily stars but youth and young adults are putting cannabinoid oil and in other products in these devices.

So, what are our concerns? These are some small studies. So, if you have people with already underlying respiratory issues, COPD, asthma, it does cause dry throat irritation, it does impede your respiratory flow, so it's really not a good product, and what we found in the state of Florida is that asthmatics actually smoked hookah and e-cigarettes more than those who were not diagnosed by a doctor with asthma. So, we really need to get some messages out there to those with asthma. It does have formaldehyde in it, and formaldehyde is the cancer-causing agent. We also know it has diacetyl, and diacetyl is what they found in popcorn lung, so it was in the butter-flavored popcorn, the butter flavoring, and it caused bronchiolitis obliterans. They're also finding that in the e-cigarette flavors it does have a volatile aldehyde, so pollutants and irritants, and these little tiny devices are interesting, so what happened before these devices came out is the youth who like the throat hit would actually disassemble



the device and drop the liquid nicotine on the electronics, the electric component, and then take a quick hit to get that throat hit again, that was such a huge draw for these young adults, and now they develop these smaller devices that you can get that throat hit a lot faster.

So, you're in a beauty salon and someone takes their cigarette out and starts vaping, are you at risk? Well, this is the only study that I could find and that is a sample size of 9 that they put in a room and they measured the air quality and, you can look this study up here, it was show her and colleagues, so basically in that air they did identify nicotine and glycerin. Glycerin is that respiratory irritant and the carcinogenic poly aromatic hydrocarbons or the carcinogens have increased by 20% and they did find aluminum, which probably was from that lithium-ion battery. From a Montana standpoint, you know, public health warned against the use of e-cigarettes, many people are and many state chronic disease prevention bureaus are saying we don't have enough evidence to support it as a smoking cessation aid, we need that regulation to say it is a safe product. Who knows 10 to 15 years down the road what we'll see, but right now we just don't have enough evidence to support it as a cessation aid.

In addition, we have issues with nicotine poisoning. So, a typical vial could contain up to 72 milligrams of nicotine, 72 milligrams. Well, it only takes 60 milligrams according to the CDC to kill 150-pound man. We have studies out where people are actually using it to commit suicide. We've had it where children have ingested it because it's fruit flavored, it doesn't, it looks almost like a something that would be okay to take. This would be the vial, look, so the American Academy of Pediatrics really put out a large call to say we've got to do something about this, we had a kid in New York, two years old, died from ingestion of the liquid nicotine and thankfully now there is regulation on electronic cigarettes, and if I can pull up here is the child nicotine poisoning prevention act, as of January now they will have to put child safety locks on the tops of those devices. And really the most important thing is it's a poison and should be treated as a poison.

So, as we're closing up here I'd like to say that the FDA as of this month has extended their authority to all tobacco products, so cigars, cigarettes, and hookah. It's a 200-plus page document and in a nutshell really what I gather from it is really the packaging, it's the devices themselves that are going to be regulated, it's the access that is going to be regulated, and you know it will be a slow process but it's way overdue in terms of what we've seen. We've seen multiple explosions of these devices, you know they're made in China primarily and there's no safety really, there's no safety. California's had a huge lawsuit, a guy became disabled from it, but just Google or, yeah just Google picture electronic cigarettes and amplifiers you'll see a lot in there.

So, there's two camps. One is harm reduction, it is harm reduction, it's not as harmful as a traditional cigarette, the e-cigarettes don't have at this point 7,000 chemicals in it so it has helped people quit smoking, but we just can't advocate it at this point. The biggest concern is those who've never tried a traditional cigarette, will they become addicted? And the literature is saying yes, there is that lead the addiction because of the nicotine, and then the potential for the uptake of traditional cigarettes. What we can advocate for is what the Department of Health and Human Services said, is the nicotine product



and counseling, so quit coach counseling and these products, obviously they have nicotine in it and nicotine is not healthy for your body but the idea is eventually you're going to get people off of nicotine altogether, and these products are what we actually use for cessation classes.

So, the take-home points here are it's not merely water vapor, and I think across the board that's what I constantly hear. It does have carcinogens in it, does have nicotine in it, there is no quality control at this point, there's not enough evidence to support it as a cessation aid, and there are carcinogens in it, and as I mentioned here like any poisons keep it away from small children and educate our asthmatics, those with asthma, about these products so that they know that it's not harm free for them especially. And so, at this point I'll hand it over to Anna and answer any questions that you have and if we don't have time to answer all the questions I can certainly send out emails or you have my contact information here if you have any follow-up. I will be giving an in-person presentation with newer data as we get it in that will be probably the beginning of March, end of February in Montana, so thank you very much.

MACP: Thank You, Mary! I'm going to go ahead and transition back while we're waiting for anyone to type questions in the chat box, please feel free, I'm going to reiterate while we're waiting on that to see if anything pops up that I will be emailing everyone who actually logged in through the webinar today just with a with that brief evaluation and if you did not log in yourself, if you're in a group of people watching, you'll need to contact me yourself, so my contact information is up here on the screen. I'll send out a short evaluation for you to respond to and then send you your CE certificate. We were approved for CE from the Board of Respiratory Care Practitioners and the Board of Pharmacy in Montana and those should work for nurses as well.