



THE TRUTH ABOUT VAPING

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WHAT IS VAPING?

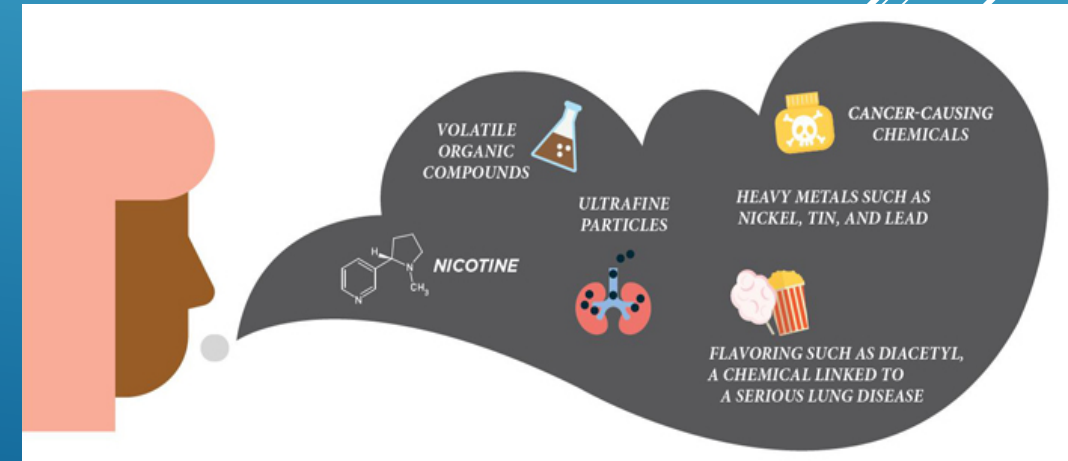
Using an e-cigarette

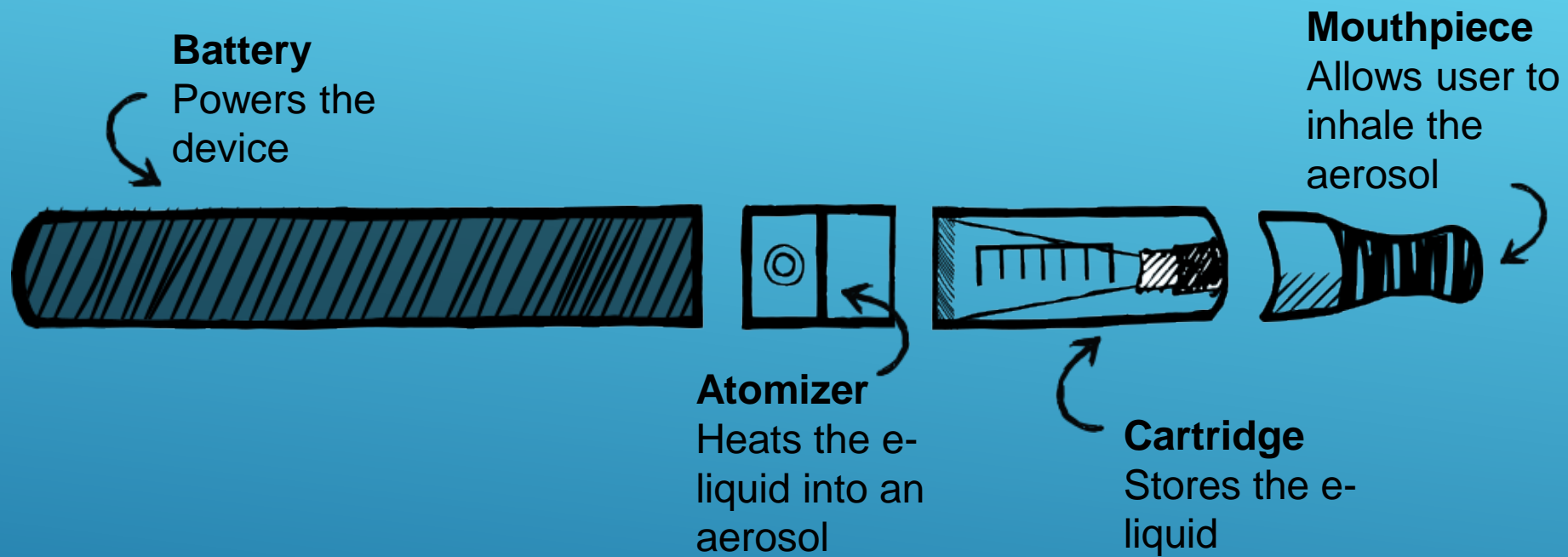


WHAT IS AN E-CIGARETTE?

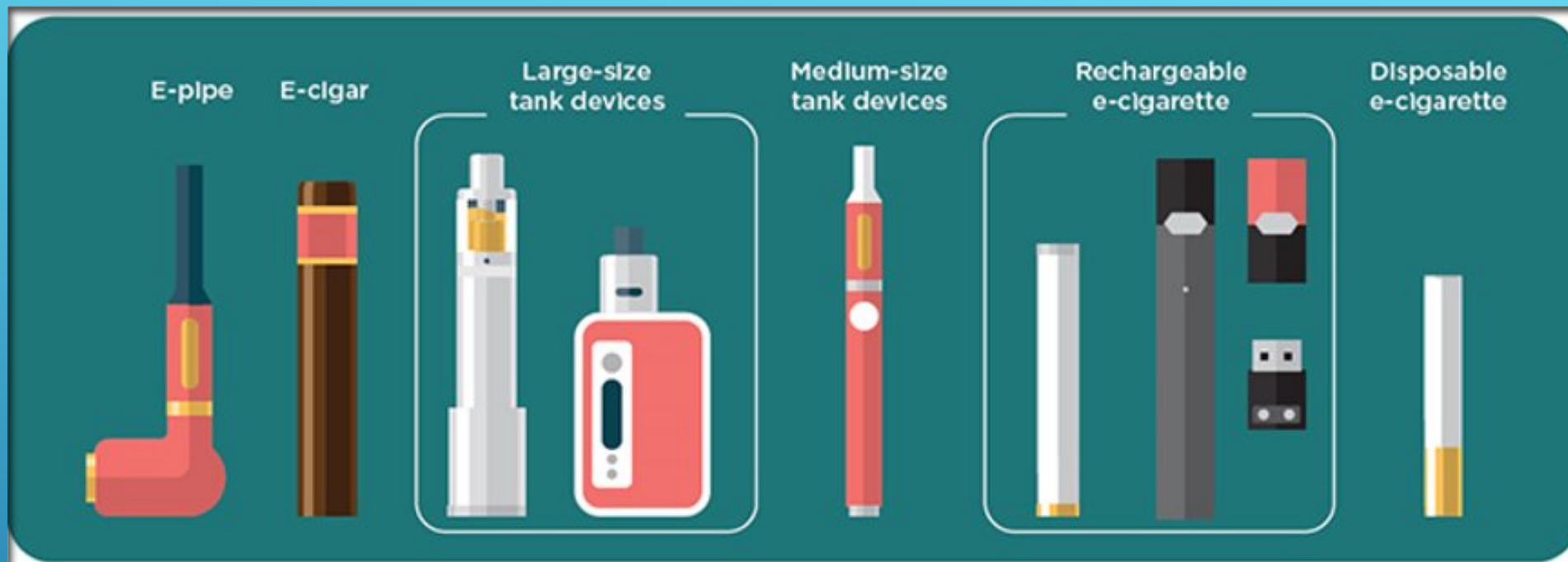
- ▶ A device that produces an aerosol by heating a liquid that contains nicotine
- ▶ E-Liquid- flavorings and other chemicals
- ▶ Users inhale this aerosol
- ▶ Bystanders breathe in aerosol that user exhales

WHAT IS AN E-CIGARETTE?



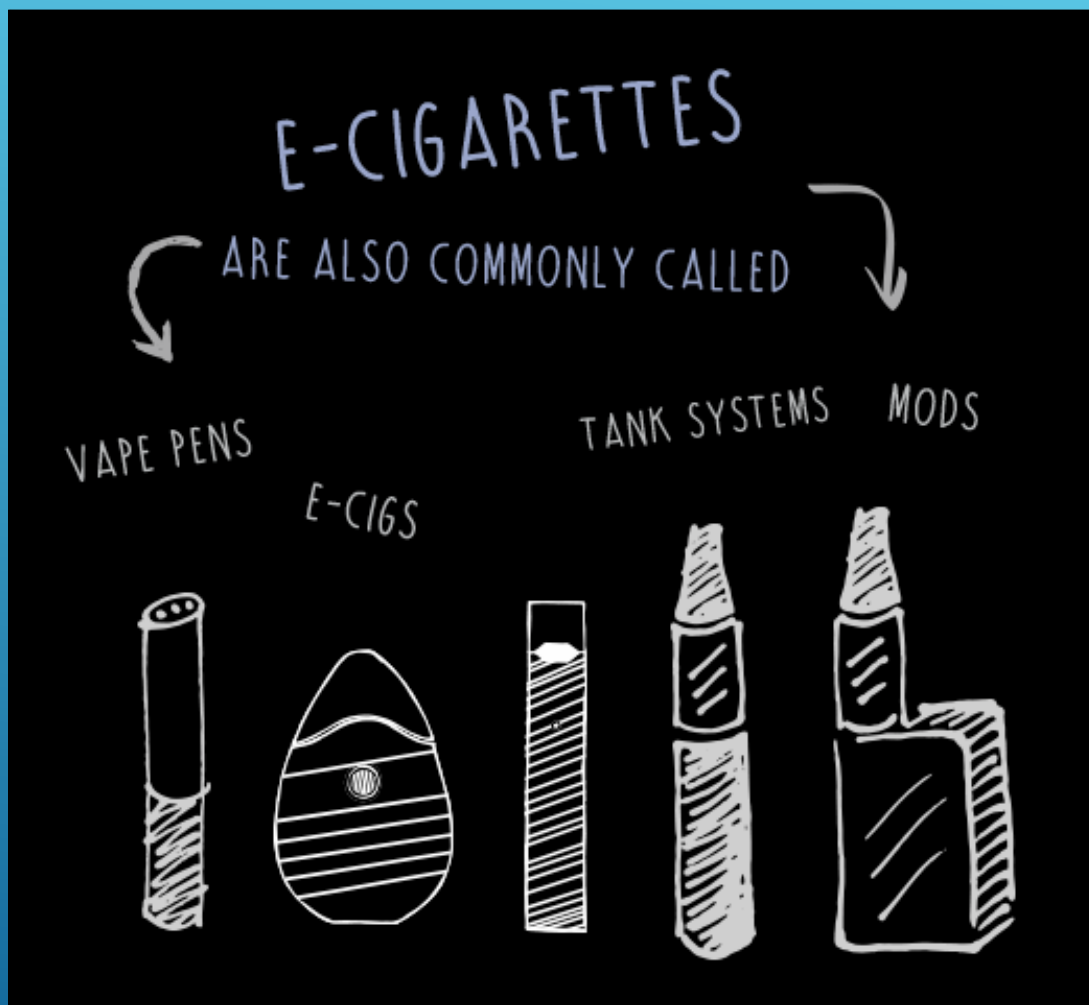


E-CIGARETTE



- ▶ Resemble
 - ▶ Regular cigarettes
 - ▶ Cigars
 - ▶ Pipes
 - ▶ Pens
 - ▶ USB sticks

E-CIGARETTE



- ▶ E-cigs
- ▶ E-hookahs
- ▶ Mods
- ▶ Vape-pens
- ▶ Vapes
- ▶ Tank systems
- ▶ Electronic nicotine delivery systems (ENDS)

E-CIGARETTE

IS AN E-CIGARETTE A
TOBACCO PRODUCT?

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YES!!

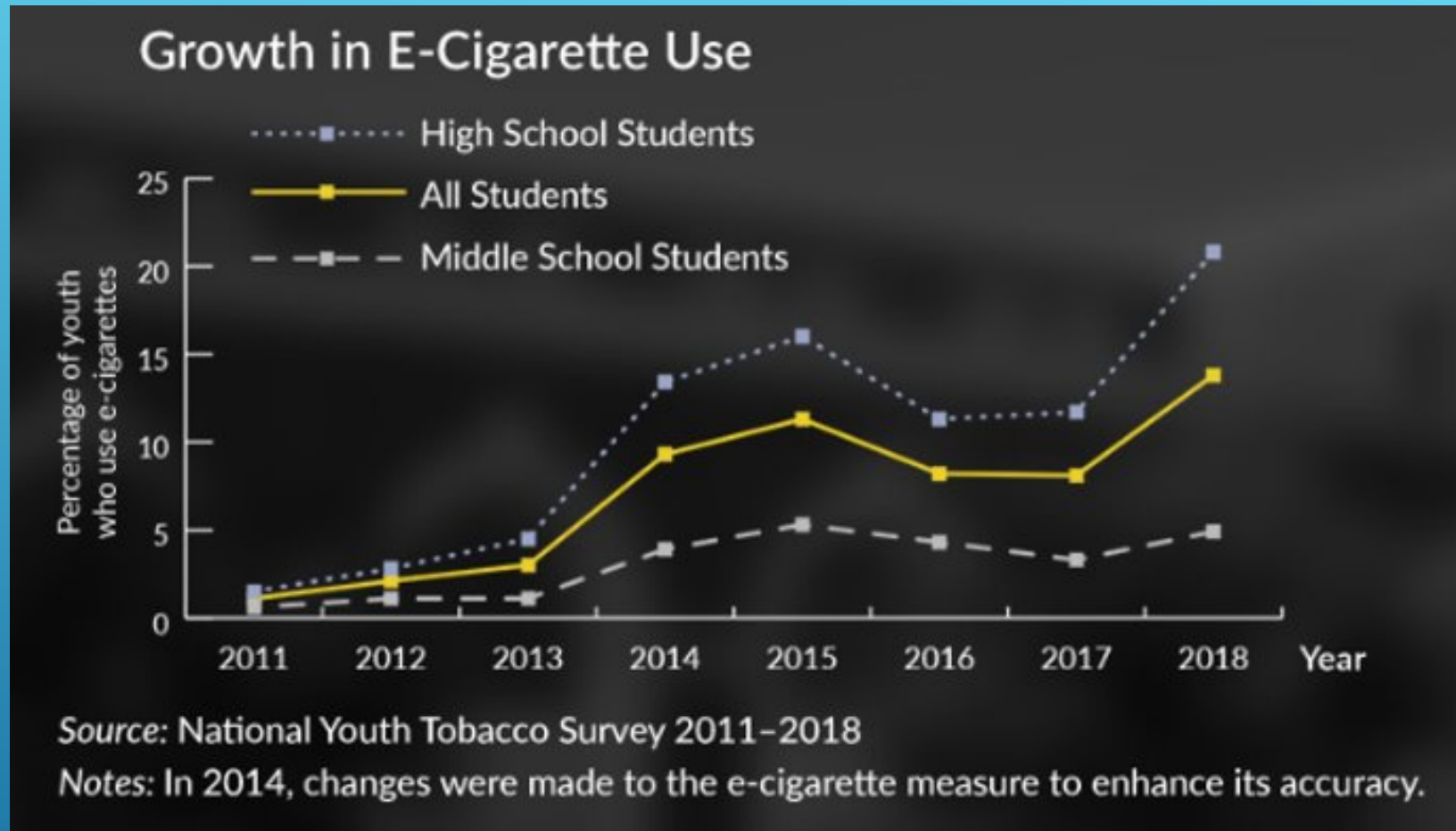
E-cigarettes represent an evolution in a long history of tobacco products in the United States

WHY ARE WE DISCUSSING THIS TODAY?

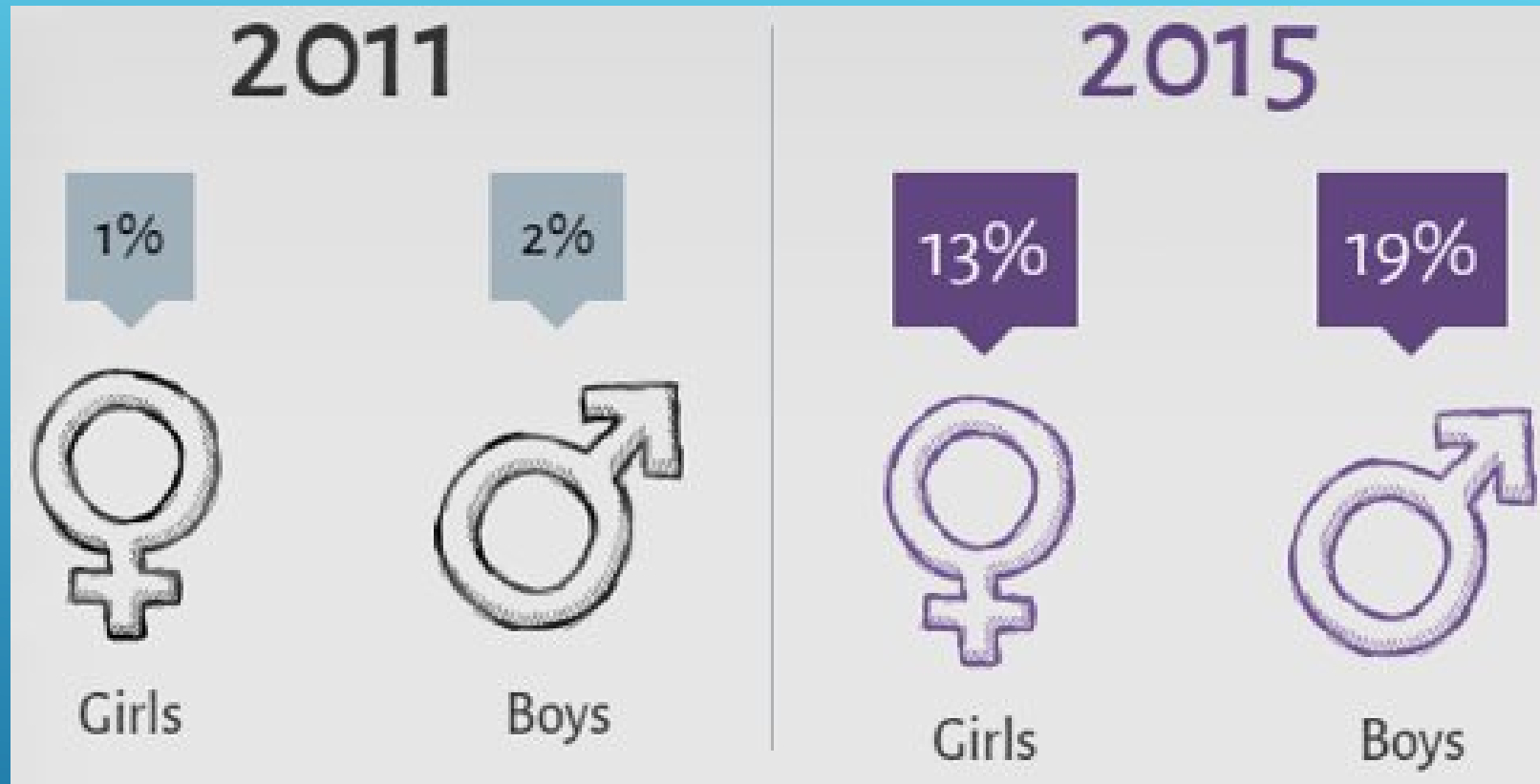
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- ▶ E-cigarette use among youth and young adults is now a public health concern

WHY ARE WE DISCUSSING THIS
TODAY?



E-CIGARETTE USE AMONG YOUTH



E-CIGARETTE USE AMONG YOUTH

- ▶ Use higher among high school students than adults
- ▶ In 2018 - 1 in 5 high school students reported using e-cigarettes
- ▶ Most commonly used tobacco product among youth today

WHY ARE WE DISCUSSING THIS
TODAY?

- ▶ Acute lung injury and deaths
- ▶ Growing concern about the long term health effects of aerosolizing nicotine and other chemicals in vaping devices
 - ▶ additives, heavy metals, ultrafine particles include toxins and carcinogens

WHY ARE WE DISCUSSING THIS
TODAY?

- ▶ The popularity of vaping may be renormalizing smoking behavior
- ▶ Crucial that the progress made in reducing cigarette smoking among youth not be compromised by the initiation and use of e-cigarettes

WHY ARE WE DISCUSSING THIS
TODAY?

- ▶ Most commonly cited reasons for using e-cigarettes
 - ▶ Curiosity
 - ▶ Flavoring/taste
 - ▶ Low perceived harm compared to other tobacco products
 - ▶ Look “cool”

E-CIGARETTE USE AMONG YOUTH



85%
of e-cigarette users ages
12-17 use flavors

menthol
alcohol
candy

fruit
chocolate
sweets

- ▶ EVALI
- ▶ Increased youth exposure to nicotine
- ▶ Besides nicotine, e-cigarette aerosol contains other harmful substances
 - ▶ Carcinogens, toxins, lung diseases
- ▶ Serving as a gateway for initiation on conventional cigarettes
- ▶ Exposure to secondhand aerosol
- ▶ Injuries due to e-cigarette devices

POTENTIAL HARMS OF E-CIGARETTES



EVALI

- ▶ E-cigarette- or vaping-associated lung injury
- ▶ Confirmed case
 - ▶ recent use of an e-cigarette product
 - ▶ breathing illness
 - ▶ infection ruled out
 - ▶ other common causes of illness ruled out



CDC DATA – OCT 15TH 2019

- ▶ 1,479 cases of e-cigarette- or vaping-associated lung injury -EVALI
- ▶ 33 deaths
 - ▶ Age range 17 – 75 years
- ▶ Alaska remains the only state unaffected by the outbreak



TEXAS- EVALI

- ▶ Department of State Health Services (DSHS) - 147 cases
- ▶ One death has been reported in Texas
- ▶ 21 other possible Texas cases

SYMPTOMS

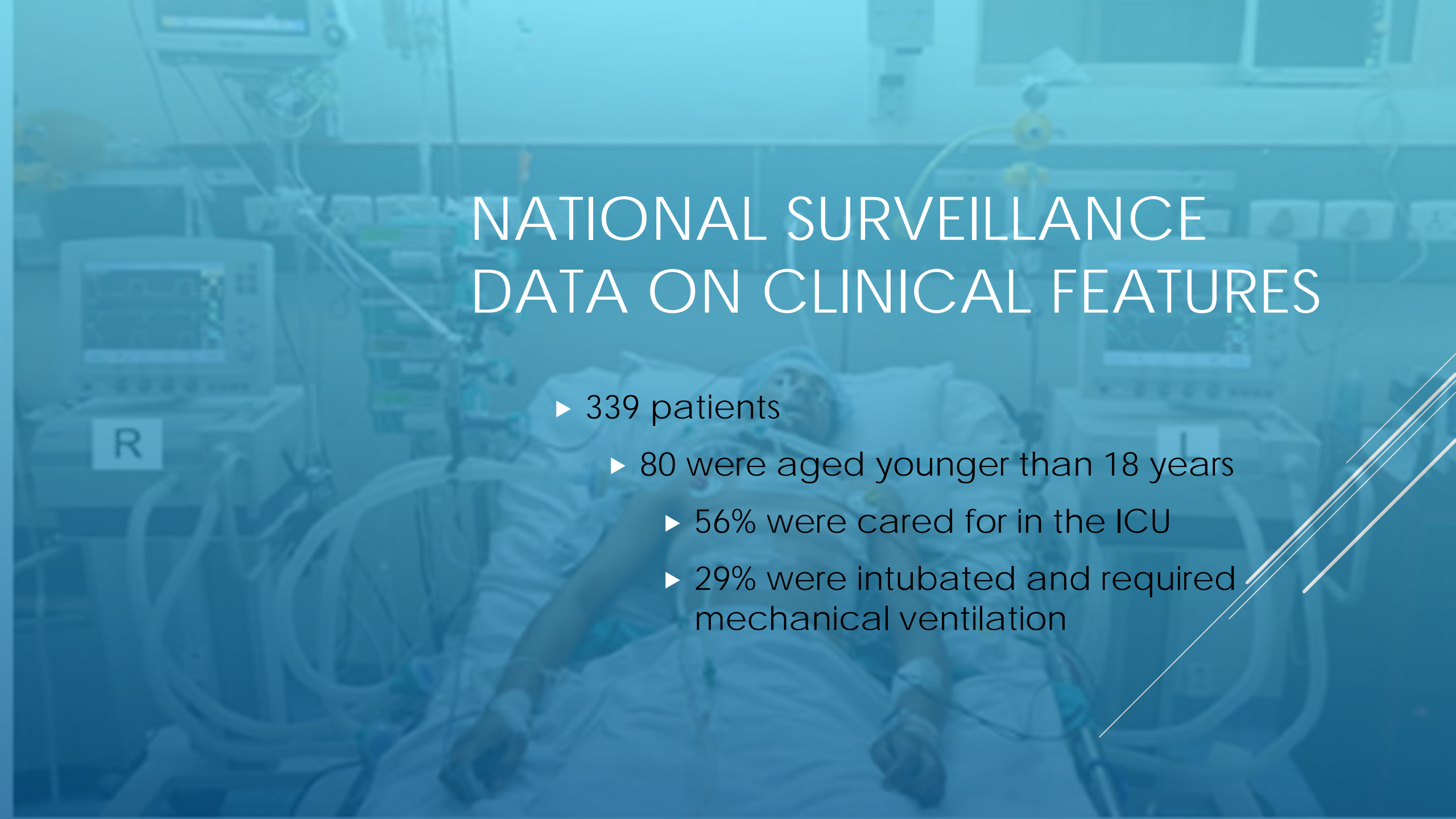
- ▶ non-specific
- ▶ cough, shortness of breath and chest pain
- ▶ nausea, vomiting and fatigue
- ▶ duration of symptoms – may take several days to several weeks to appear



NATIONAL SURVEILLANCE DATA ON CLINICAL FEATURES

- ▶ 339 patients - data submitted to CDC
 - ▶ 95% initially experienced respiratory symptoms such as cough, chest pain or shortness of breath
 - ▶ 77% have gastrointestinal symptoms such as abdominal pain, nausea, vomiting and diarrhea
 - ▶ 47% required transfer to ICUs
 - ▶ 22% required mechanical ventilation





NATIONAL SURVEILLANCE DATA ON CLINICAL FEATURES

- ▶ 339 patients
 - ▶ 80 were aged younger than 18 years
 - ▶ 56% were cared for in the ICU
 - ▶ 29% were intubated and required mechanical ventilation



EPIDEMIOLOGY

- ▶ 1,043 patients - data on age and sex:
 - ▶ 70% male
 - ▶ 80% aged younger than 35 years
 - ▶ 15% are aged younger than 18 years

SUBSTANCES USED

- ▶ 573 patients with available information on substances used in e-cigarettes in the 90 days before symptom onset
 - ▶ 76% reported using tetrahydrocannabinol (THC)-containing products with or without nicotine-containing products
 - ▶ 32% reported exclusive use of THC-containing products
 - ▶ 58% reporting using nicotine-containing products, with or without THC-containing products
 - ▶ 13% reported exclusive use of nicotine-containing products.

Siegel DA, et al. MMWR Morb Mortal Wkly Rep.
2019;doi:<http://dx.doi.org/10.15585/mmwr.mm6841e3>.

CDC – OCT 11 2019

- ▶ “Although THC-containing products appear to be implicated in these injuries, the specific exposures responsible for the lung injuries have not been identified, nor have nicotine-containing products been excluded as a possible cause”
- ▶ Based on testing of samples –
 - ▶ Does not appear to be one product or substance involved in all the cases
 - ▶ There may be more than one cause to this outbreak



FDA

“FDA at this time has still not identified a specific product or substance that has been definitively linked to the respiratory illnesses in this outbreak”

Mitch Zeller, JD, director of the Center for Tobacco Products at the FDA.

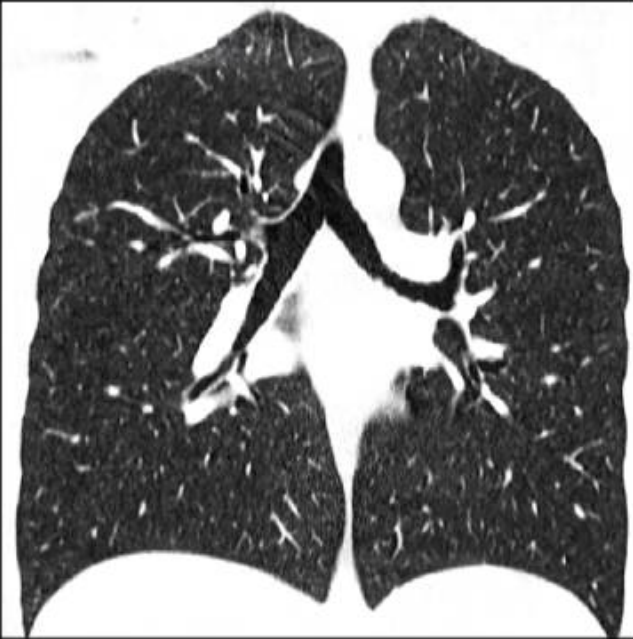
CDC RECOMMENDATIONS

- ▶ CDC recommends against the use of e-cigarette or vaping products that contain THC and advises people to reconsider use of all e-cigarette or vaping products until the investigation into the outbreak has concluded

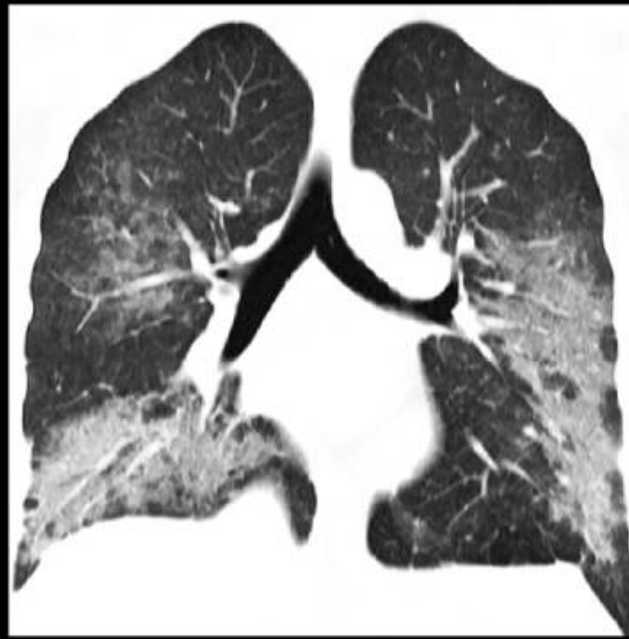
EMERGING DATA

- ▶ Chronic vaping can cause the same lung changes seen in smokers of traditional cigarettes - nicotine
- ▶ Increased cardiovascular risk-nicotine
- ▶ Known Carcinogens being identified in E-liquids

NORMAL LUNG



VAPING LUNG



- 30 year old female
- Otherwise healthy
- Presented with shortness of breath
- Vaping marijuana
- Rapidly progressive respiratory failure
- Required advanced life support
- 70 days on ECMO- got a lung transplant

- ▶ A psychomotor stimulant drug
- ▶ Primary psychoactive and addictive constituent in the smoke of cigarettes and e-cigarettes
- ▶ Determines smoking dependence

NICOTINE

- ▶ E-liquids contain nicotine in widely variable concentrations
- ▶ Factors influencing amount of aerosolized nicotine available for inhalation
 - ▶ Concentration on liquid nicotine
 - ▶ Power of the device being used (battery voltage, heater resistance)
 - ▶ User behavior – puff duration and inter puff interval
- ▶ Large variability in plasma nicotine concentration

NICOTINE IN E CIGARETTES



- ▶ Highly addictive
- ▶ Can harm the developing adolescent brain
- ▶ As addictive as heroin and cocaine

NICOTINE

- ▶ Adolescence (10-19 years) – a developmental period associated with increased vulnerability to nicotine addiction
- ▶ Nicotine use during adolescence - disrupts the formation of brain circuits that control attention, learning and susceptibility to addiction



NICOTINE

- ▶ Substantial evidence - nicotine negatively influences adolescent brain development
- ▶ The brain undergoes significant neurobiological development during adolescence
 - ▶ – sensitive to neurobiological insults such as nicotine



NICOTINE

- ▶ Adolescents and nicotine exposure
 - ▶ Deficits in attention and cognition
 - ▶ Mood disorders
 - ▶ Increase in drug seeking behavior



NICOTINE



- ▶ Adolescent exposure to nicotine has both acute and long term effects on attention and memory

NICOTINE – ATTENTION AND COGNITIVE DEFICITS



- ▶ Negative impact on brain development
 - ▶ Working memory
 - ▶ Attention span

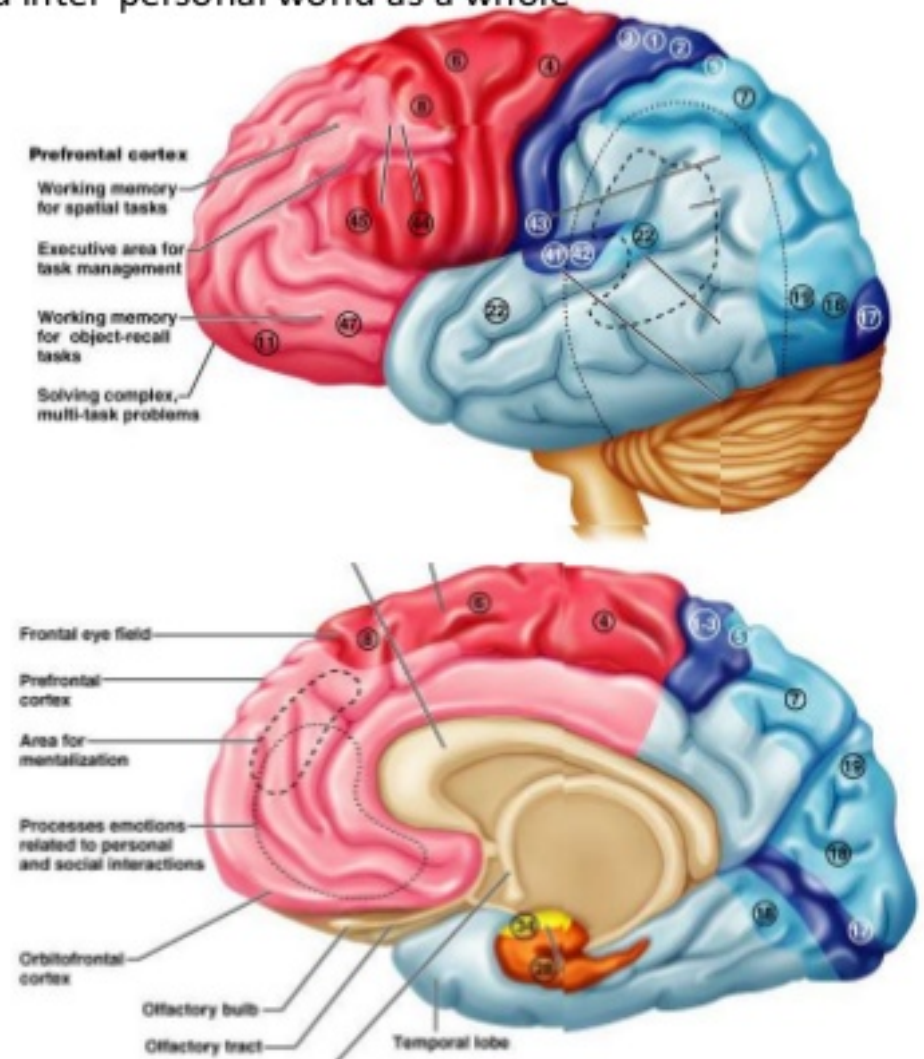
NICOTINE – ATTENTION AND COGNITIVE DEFICITS

NICOTINE – ATTENTION AND COGNITIVE DEFICITS

Prefrontal cortex: cognition

This area is remodeled during adolescence until the age of 25 and is very important for well-being; it coordinates the brain/body and inter-personal world as a whole

Intellect	Social skills
Abstract ideas	Appreciating humor
Judgment	Conscience
Personality	Mood
Impulse control	Mental flexibility
Persistence	Empathy
Complex Reasoning	
Long-term planning	
Executive functioning e.g. multiple step problem solving requiring temporary storage of info (working memory)	

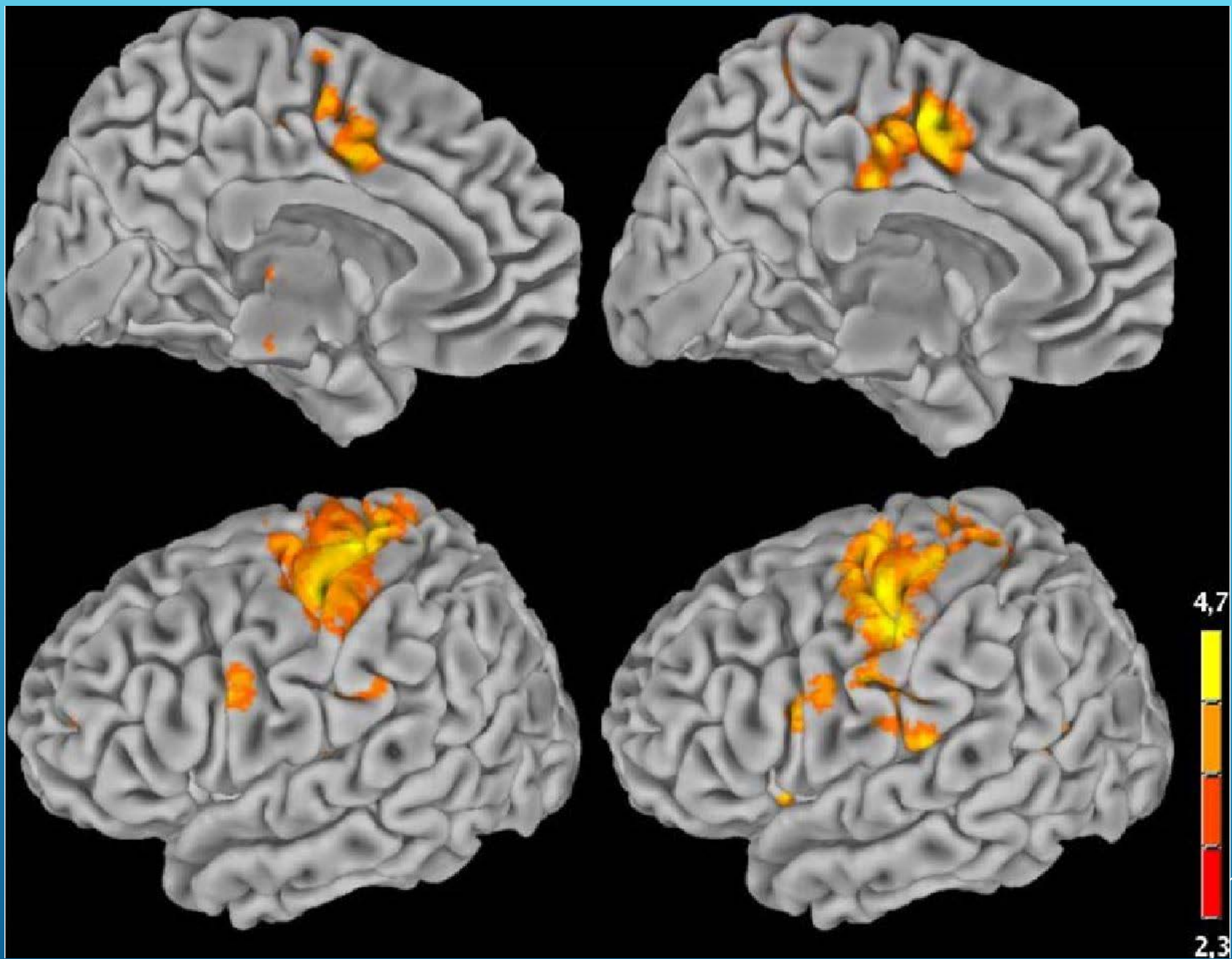


- ▶ Bergstrom et al 2008
 - ▶ Adolescent nicotine exposure in rats induces lasting synaptic changes in the prefrontal cortical regions critical for normal attention, memory and cognition
 - ▶ This causes impairments in attentional and cognitive function

NICOTINE – ATTENTION AND COGNITIVE DEFICITS

- ▶ Musso et al. (2007)
 - ▶ Adolescent users of cigarettes - decreased prefrontal cortex activation during attention tasks
 - ▶ Duration of smoking was directly correlated with the extent of reduction in prefrontal cortical activity

NICOTINE – ATTENTION AND COGNITIVE DEFICITS



- ▶ Jacobsen et al.(2005)
 - ▶ Adolescent smokers have chronic impairments in the accuracy of their working memory (e.g. in processing information from 2 sensory modalities simultaneously)
 - ▶ Impairments more severe with an earlier age of onset of smoking

NICOTINE – ATTENTION AND COGNITIVE DEFICITS

- ▶ Students who smoke e-cigarettes
 - ▶ Risking your grades
 - ▶ Potentially risking your future careers

NICOTINE – ATTENTION AND
COGNITIVE DEFICITS

- ▶ Early onset of smoking is associated with a shorter time to first onset of an anxiety disorder (Jamal et al. 2011)
- ▶ Positive association between adolescent smoking, particularly through a nicotine pathway, and anxiety in early adulthood (Moylan et al. 2013)
- ▶ Permanent problems with impulse control – failure to fight an urge or impulse that may harm oneself or other

NICOTINE - MOOD DISORDERS

- ▶ Meta-analysis of existing studies (Moylan et al. 2012)
 - ▶ Consistent evidence that tobacco use among adolescents increases their risk of anxiety disorders

NICOTINE –MOOD DISORDERS

- ▶ Drug addiction is the loss of control of drug use
- ▶ Disease of the brain reward centers (Dackis and O'Brien 2005)

NICOTINE - ADDICTION

- ▶ Nicotine affects the development of the brain's reward system
 - ▶ Nicotine addiction
 - ▶ Makes other drugs such as cocaine and methamphetamine more pleasurable

NICOTINE – ADDICTION

- ▶ Weiss et al. (2008) reported a mechanistic link among early nicotine exposure (younger than 16 years) and adult nicotine addiction

NICOTINE – ADDICTION

- ▶ Studies reveal that for most long-term tobacco users, initial use begins before 18 years of age


NICOTINE - ADDICTION

- ▶ The younger a person is when exposed to nicotine, the greater the risk of addiction


NICOTINE- ADDICTION

- ▶ Smoking is a major cause of death from cardiovascular disease
 - ▶ nicotine - potential initiating factor in the atherogenic process
 - ▶ nicotine induces the production of various inflammatory mediators involved with atherosclerotic pathogenesis


NICOTINE

- 
- ▶ E - cigarette aerosol is not harmless "water-vapor"
 - ▶ Several chemicals - carbonyl compounds and volatile organic compounds
 - ▶ No standards, considerable variation in the nature of ingredients
 - ▶ Concerns regarding the safety of inhaling e-cigarette flavorings and the chemicals generated when these are heated
 - ▶ Little is known about the long term health effects of inhaling these substances into the lungs

E-CIGARETTE AEROSOL

- 
- ▶ Recent devices -larger battery, capable of heating liquid to a higher temperature, potentially releasing more nicotine, forming additional toxins
 - ▶ Kosmider et al. (2014)
 - ▶ At high temperatures, exceedingly high levels of formaldehyde – a carcinogen- are present
 - ▶ Formed through the heating of the e-liquid solvents – propylene glycol and glycerin

E-CIGARETTE AEROSOL

- 
- ▶ Formaldehyde
 - ▶ Embalming fluid, glue
 - ▶ Benzene
 - ▶ Known carcinogen linked to leukemia
 - ▶ Diacetyl
 - ▶ Popcorn lung
 - ▶ Metal particles
 - ▶ Nickel, tin and aluminum

E-CIGARETTE AEROSOL

- ▶ Can be readily customized by their users
- ▶ Often used to deliver drugs other than nicotine

E-CIGARETTE DEVICE

- ▶ Lack of device regulation
- ▶ Battery failures and explosions – house and car fires, injuries and even death

E-CIGARETTE DEVICE

U.S. & WORLD

THE DAY'S TOP NATIONAL AND INTERNATIONAL NEWS

Texas Man Died After Vape Pen Explosion Severed Artery in Neck: ME

William Eric Brown died due to "penetrating trauma from exploding vaporizer pen," according to the medical examiner

By Scott Gordon

Published Feb 5, 2019 at 11:52 AM | Updated at 5:51 PM EST on Feb 5, 2019

Vape explodes and blinds 14-year-old kid in NYC mall, blast caused by battery explosion – TomoNews

By ave40 12/22/2017

E-CIGARETTE DEVICE INJURIES

NEWS

An e-cigarette exploded inside this man's mouth

By [Alexandra Klausner](#)

January 17, 2017 | 10:13am | Updated

**North Port man badly burned in
vape pen explosion**

E-CIGARETTE DEVICE INJURIES

- ▶ Incidents of young adults and children ingesting the liquid in the cartridges
- ▶ Acute nicotine poisoning can cause seizures, death

E-CIGARETTE DEVICE

- ▶ JUUL is a brand of e-cigarette that is shaped like a USB flash drive
- ▶ JUULs have very high level of nicotine
- ▶ 1 JUUL pod contains as much nicotine as a pack of 20 regular cigarettes!

JUUL



- ▶ The harmful chemicals in e-cigarettes and even bacteria can be spread through the aerosols
- ▶ Particularly vulnerable to children because of their developing lungs



SECOND HAND AEROSOL EXPOSURE

“Those who fail to learn from history are doomed to repeat it”

- Winston Churchill, 1948

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- ▶ Tobacco has been growing wild in the Americas for 8000 years
- ▶ 2000 years ago -began to be chewed and smoked during cultural or religious ceremonies
- ▶ First European to discover smoking was Christopher Columbus
- ▶ 1531 - tobacco was cultivated for the first time in Europe (at Santo Domingo)
- ▶ 1600 - tobacco use had spread across Europe and England
- ▶ 1700 - smoking had become more widespread and a tobacco industry had developed

HISTORY OF TOBACCO INDUSTRY

- ▶ Earliest known instance of smoking link to ill health in 1602
 - ▶ Anonymous English author published an essay stating illnesses often seen in chimney sweepers were caused by soot and that tobacco may have similar effects
- ▶ 1795 Samuel Thomas von Soemmering of Mainz (Germany) reported that he was becoming more aware of cancers of the lip in pipe smokers
- ▶ 1798 -US physician Benjamin Rush wrote on the medical dangers of tobacco
- ▶ 1920s - first medical reports linking smoking to lung cancer began to appear
 - ▶ Many newspaper editors refused to report these findings as they did not want to offend tobacco companies who advertised heavily in the media
- ▶ 1950s and 1960s – major medical reports confirmed that tobacco caused serious diseases

HISTORY OF TOBACCO INDUSTRY

- ▶ 1953- tobacco industry faced a crisis of cataclysmic proportions
- ▶ Smoking had been categorically linked to the dramatic rise of lung cancer
- ▶ Smoking caused lung diseases, cardiac diseases, leading to death
- ▶ Major, peer-reviewed medical journals as well as throughout the general media

HISTORY OF TOBACCO INDUSTRY

- ▶ CEOs came together in December 1953 to map a strategy
 - ▶ John W. Hill - the president of the nation's leading public relations firm, Hill & Knowlton
- ▶ Hill understood that simply denying emerging scientific facts would be a losing game
 - ▶ seizing and controlling science rather than avoiding it
 - ▶ companies should now associate themselves as great supporters of science
 - ▶ demand more science, not less
- ▶ Declare the positive value of scientific skepticism of science itself
 - ▶ strategy - support and amplify the views of skeptics of the causal relationship between smoking and disease
 - ▶ tobacco industry research funding to academic scientists to draw new skeptics

HISTORY OF TOBACCO INDUSTRY

- ▶ Goal, according to Hill, would be to **build and broadcast a major scientific controversy**
- ▶ Message for public - issue of the health effects of smoking remains an open question
- ▶ Doubt, uncertainty, and the truism that there is more to know would become the industry's collective new mantra
- ▶ Hill had quit smoking himself

HISTORY OF TOBACCO INDUSTRY

- ▶ Hill & Knowlton produced a compendium of statements by physicians and scientists who questioned the cigarette–lung cancer link
- ▶ Called for new research
 - ▶ implied that existing studies were inadequate or flawed
 - ▶ made the industry seem a committed participant in the scientific enterprise rather than a self-interested critic

HISTORY OF TOBACCO INDUSTRY

- ▶ Tobacco Industry Research Committee
- ▶ Public announcement of the committee - full-page advertisement run in more than 400 newspapers across the country
- ▶ “frank statement”
- ▶ “We accept an interest in people's health as a basic responsibility, paramount to every other consideration in our business. We believe the products we make are not injurious to health. We always have and always will cooperate closely with those whose task it is to safeguard the public health”

HISTORY OF TOBACCO INDUSTRY

- ▶ It is an obligation of the Tobacco Industry Research Committee at this time to remind the public of these essential points
 - ▶ There is no conclusive scientific proof of a link between smoking and cancer
 - ▶ Medical research points to many possible causes of cancer
 - ▶ The millions of people who derive pleasure and satisfaction from smoking can be reassured that every scientific means will be used to get all the facts as soon as possible

HISTORY OF TOBACCO INDUSTRY

- ▶ Tobacco companies falsely denied, distorted and minimized the link between cigarette smoking and disease, even though they internally recognized its existence
- ▶ 1964 Surgeon General's report concluded that smoking cigarettes causes death and disease
- ▶ 1971 television interview, the president of Philip Morris still denied the health risks

HISTORY OF THE TOBACCO INDUSTRY

- ▶ Tobacco companies falsely denied that they manipulate the level of nicotine in their products to create and sustain addiction, and have been since at least 1954
 - ▶ In 1994, the CEO of R.J. Reynolds testified in a public hearing held by Congress that the company does not "add, or otherwise manipulate nicotine to addict smokers" or "do anything to hook smokers or to keep them hooked."

HISTORY OF TOBACCO INDUSTRY

- ▶ Tobacco companies concealed evidence and publicly denied that nicotine is addictive
 - ▶ 1982, the National Institute of Drug Abuse confirmed that nicotine is addictive
 - ▶ 1997 Time magazine, the president and CEO of Philip Morris was quoted as saying "If [cigarettes] are behaviorally addictive or habit forming, they are much more like ... Gummi Bears, and I eat Gummi Bears, and I don't like it when I don't eat my Gummi Bears, but I'm certainly not addicted to them."

HISTORY OF THE TOBACCO INDUSTRY

- ▶ Tobacco companies falsely marketed and promoted low-tar and light cigarettes as less harmful than regular cigarettes
 - ▶ keep people smoking
 - ▶ sustain revenues

HISTORY OF THE TOBACCO INDUSTRY

- ▶ Tobacco companies internally acknowledged that secondhand smoke is hazardous to nonsmokers, yet still gave false and misleading public statements denying the fact
- ▶ 1986 Surgeon General's report concluded that exposure to secondhand smoke is a health hazard to nonsmokers
- ▶ 1987, Philip Morris released a series of advertisements trying to convince public that second hand smoke is not harmful

HISTORY OF TOBACCO INDUSTRY

- ▶ Traditional cigarette companies own large parts of the vape and e - cigarette market
- ▶ They are fighting against regulation using their old playbook

HISTORY OF TOBACCO INDUSTRY

**A LIAR'S WORST
ENEMY....
IS SOMEONE
WITH A GOOD
MEMORY.**

- ▶ Prevalence of cigarette smoking continued to grow in the early 20th Century
 - ▶ development of new forms of tobacco promotion
 - ▶ ability of the tobacco industry through its power and wealth to influence the policies of political parties
- ▶ Later in the twentieth century, smoking became less popular
 - ▶ Rapid increase in knowledge of the health effects of both active and passive smoking.
 - ▶ People also became aware of the tobacco industry's efforts to mislead the public about the health effects of smoking
- ▶ The first successful lawsuits against tobacco companies over smoking-related illness happened in the latter part of the 20th Century

HISTORY OF TOBACCO INDUSTRY

- ▶ Smoking prevalence rates have declined in the traditional markets of North America and Western Europe
- ▶ Tobacco industry has re-focused its promotional efforts onto the less developed and emerging nations in Africa, Asia, the Middle East, the former Soviet Union and Latin America
 - ▶ Weak regulatory environment in these countries
- ▶ If current patterns continue, **tobacco use will kill approximately 10 million people every year throughout the world by 2020**
 - ▶ 70% of these deaths will occur in less developed and emerging nations.

CURRENT GLOBAL SMOKING TRENDS

- ▶ E-cigarettes introduced as aid to stop smoking
 - ▶ Not FDA approved for this indication
 - ▶ No scientific evidence on the effectiveness as aid to quit smoking

HISTORY OF TOBACCO INDUSTRY

- ▶ Project a risk free image in their marketing
- ▶ Offer enticing candy-like flavors that appeal to our youth
- ▶ Marketing – “cool” factor

TOBACCO INDUSTRY- TARGETING OUR YOUTH

- ▶ Incorporating e cigs into smoke free policies
- ▶ Preventing access to e cigs by youth
- ▶ Regulation of e cig marketing likely to attract youth
- ▶ Educational initiative targeting youth and young adults

ACTIONS WE CAN TAKE

- ▶ If you use tobacco, it is never too late to stop
- ▶ Free help options are available
 - ▶ Teen.smokefree.gov
 - ▶ 1-800-QUITNOW
- ▶ Talk to your parents and healthcare provider

WHAT CAN YOU DO TO STOP?

- ▶ Potential risks to your long-term health outweigh any enjoyment in the moment

CONCLUSION

- ▶ We have worked too hard over the past 50 years to reduce smoking rates among young people to let the tobacco industry now profit off of getting them hooked on nicotine e-cigarettes

CONCLUSION