

Hookah Smoking: Known Health Effects and Associated Substances



The Triangulum: Tobacco, Marijuana, and E-Cigarettes

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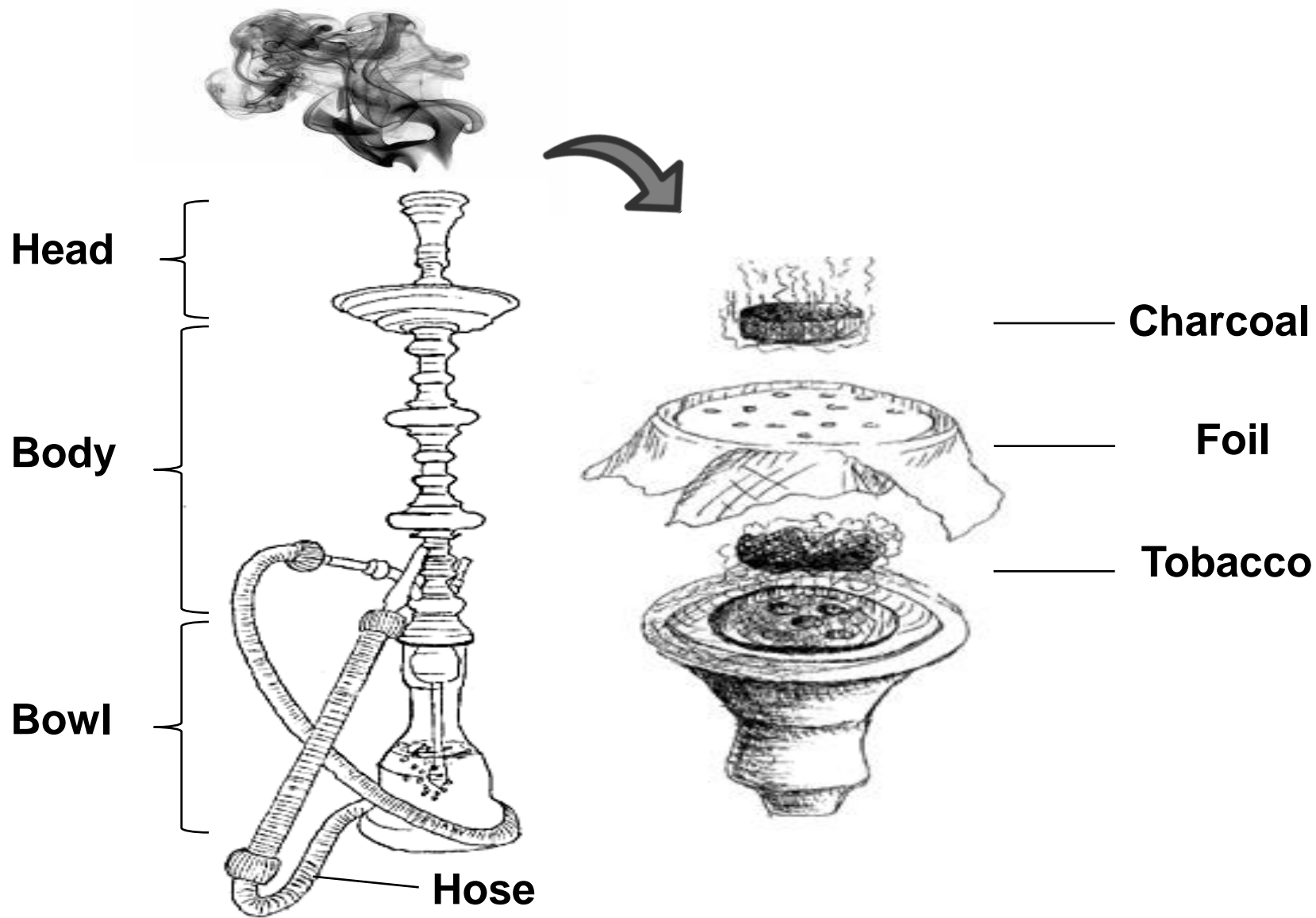
Wendie Robbins (UCLA)

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Tobacco-Related Disease Research Program

Hookah Smoking

- > 500 year-old form of tobacco use
- Unsubstantiated belief “smoke should be first passed through water so that it would be rendered harmless.”
- i.e. waterpipe, gouza, narghile, or shisha



Schematic showing the major components of a Hookah

From Cultural to Social



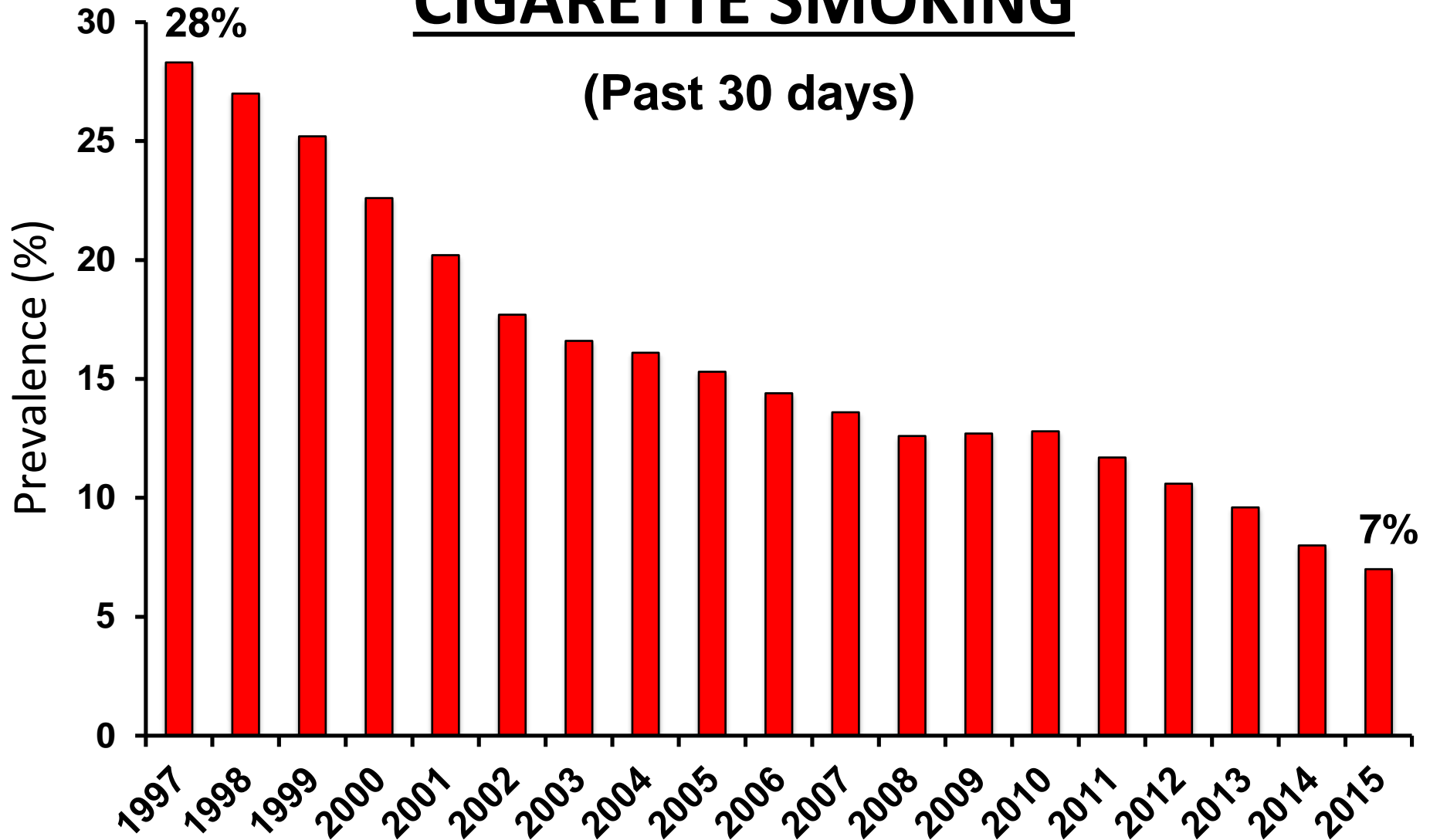
Then



Now

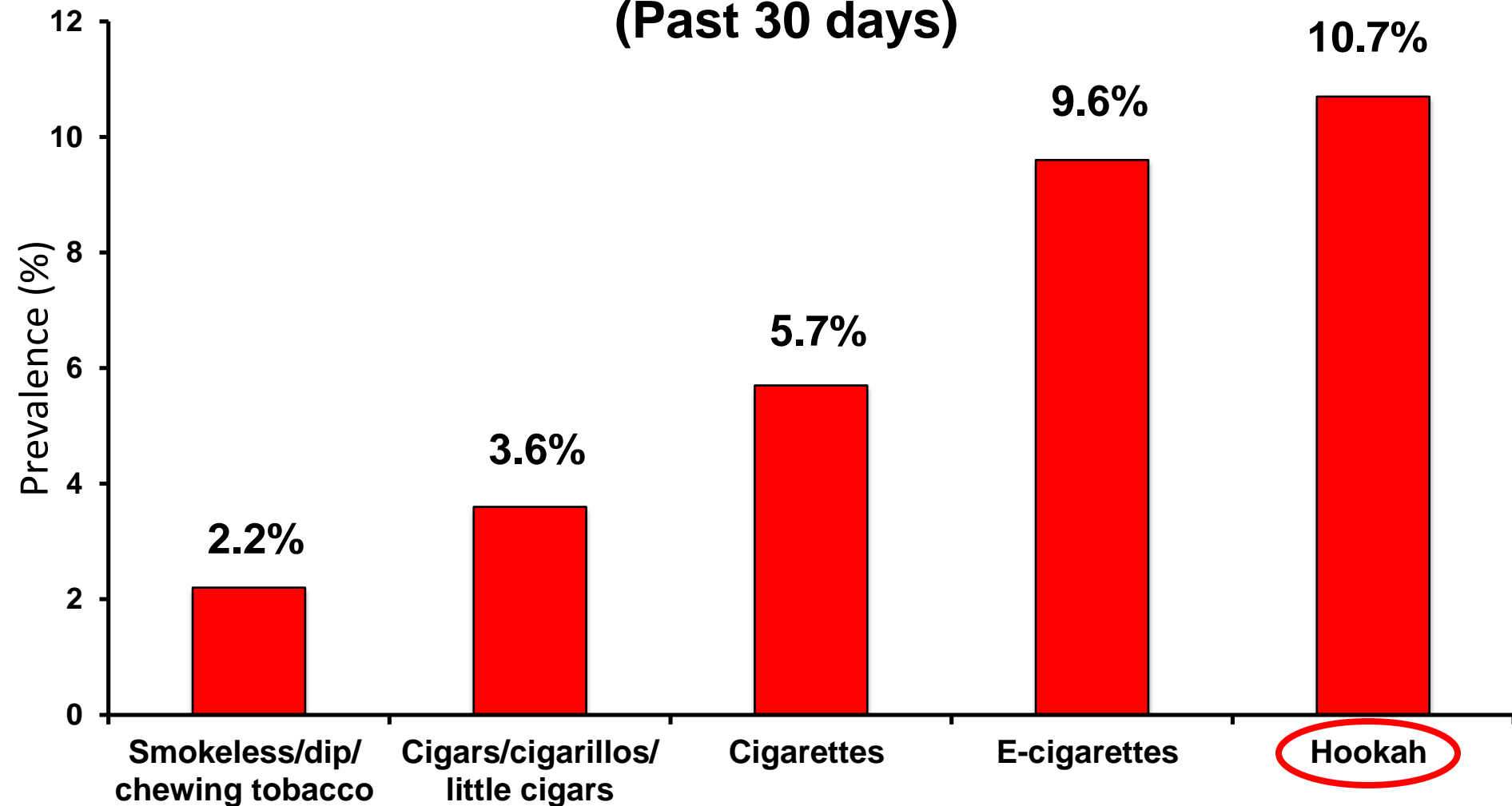
HIGH SCHOOL STUDENTS REPORTING CIGARETTE SMOKING

(Past 30 days)

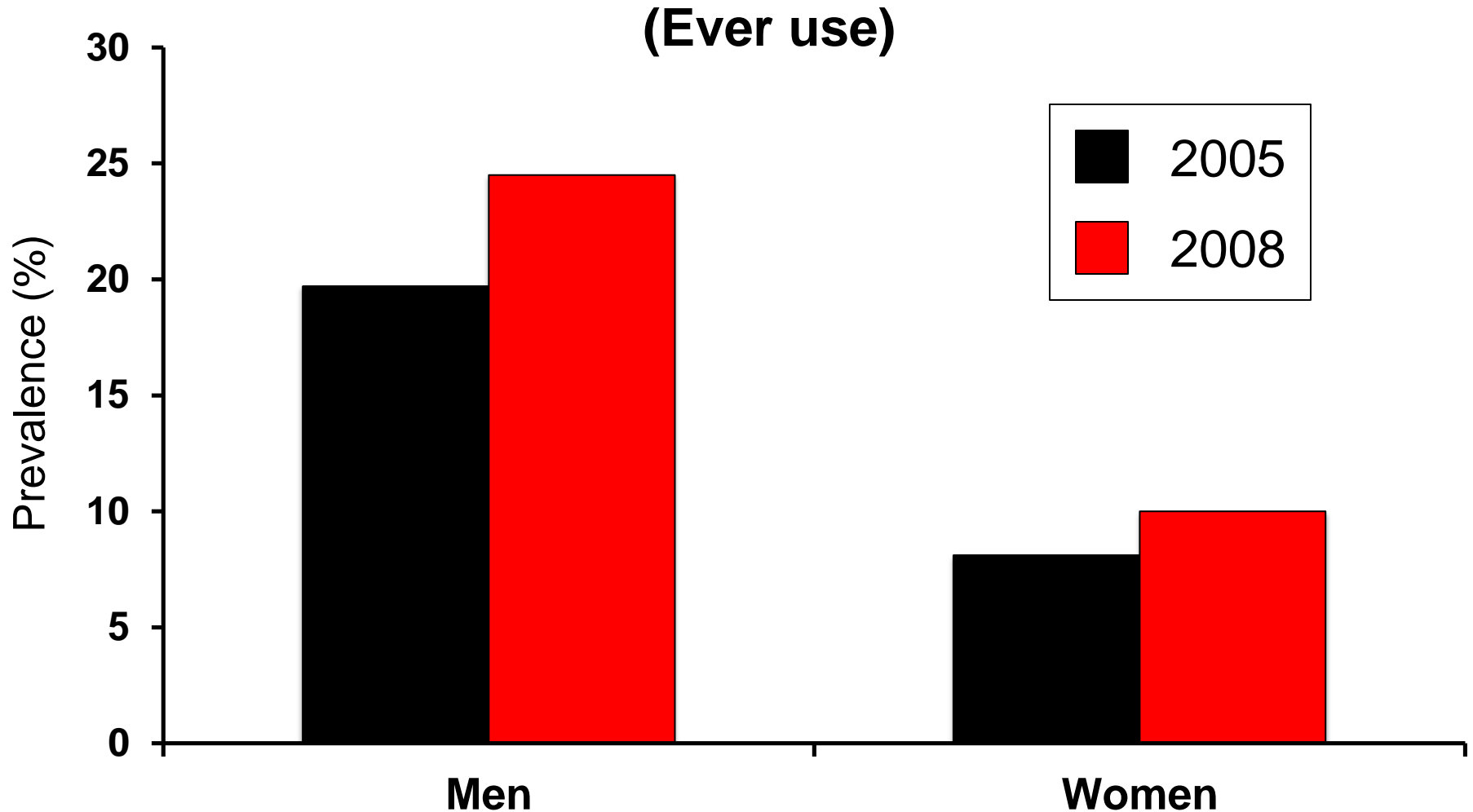


HIGH SCHOOL STUDENTS REPORTING ALTERNATIVE TOBACCO PRODUCT USE

(Past 30 days)



YOUNG ADULTS REPORTING HOOKAH SMOKING

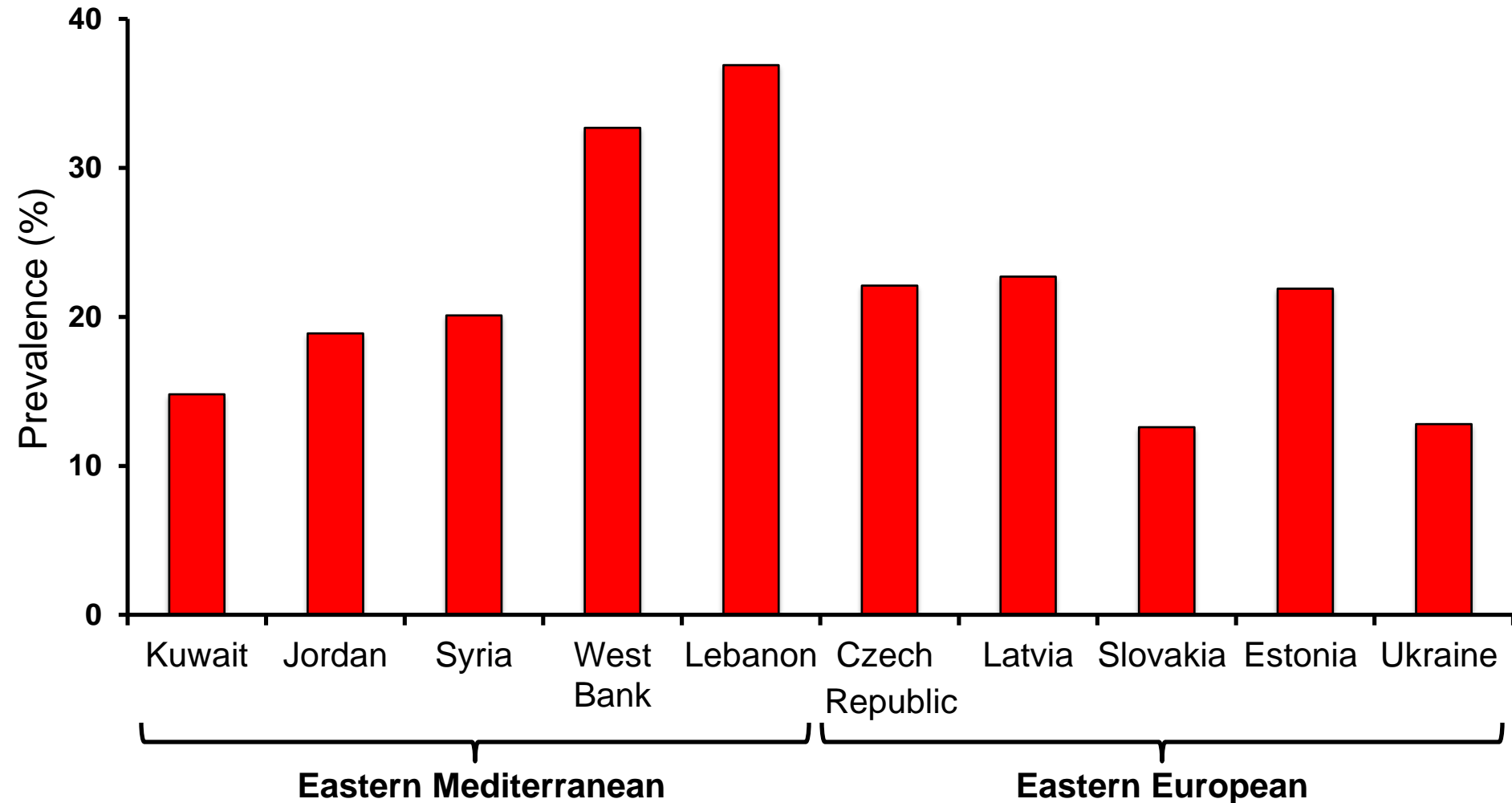


Global Epidemiology

Nicotine Tob Res. 2016 Apr;18(4):395-402. doi: 10.1093/ntr/ntv101. Epub 2015 May 9.

Waterpipe Tobacco Smoking Prevalence and Correlates in 25 Eastern Mediterranean and Eastern European Countries: Cross-Sectional Analysis of the Global Youth Tobacco Survey.

Jawad M¹, Lee JT², Millett C².



Global Epidemiology

Nicotine Tob Res. 2016 Apr;18(4):395-400

Waterpipe Tobacco Use in the Eastern Mediterranean and South Tobacco Survey.

Eastern Mediterranean and South Tobacco Survey.

Jan

Prevalence (%)

30

20

10

0

Kuwait

Syria

West Lebanon

Czech

Latvia

Slovakia

Estonia

Ukraine

Sinha et al., *Indian J Comm Med*, 2003; Narain et al. *Indian J Med Res*. 2011;133:300-7



Global Epidemiology

Nicotine Tob Res. 2016 Apr;18(4)

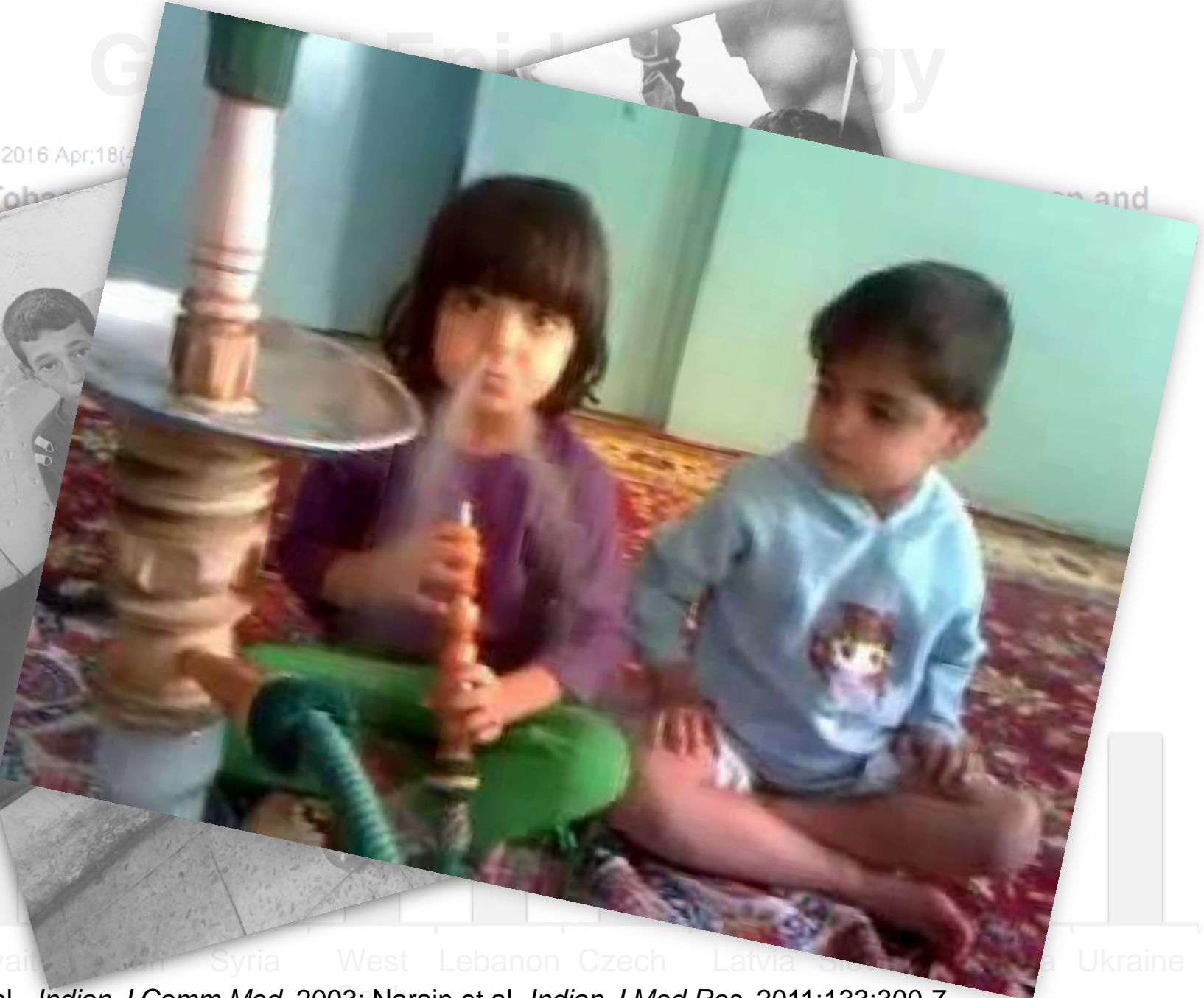
Waterpipe Tobacco Use in Eastern Mediterranean Region

Ja

Prevalence (%)

30
20
10
0

Kuwait Syria West Lebanon Czech Latvia Georgia Ukraine



Sinha et al., *Indian J Comm Med*, 2003; Narain et al. *Indian J Med Res.* 2011;133:300-7

Polysubstance Use



Hookah smoking is associated with polysubstance use especially marijuana, cigarettes and alcohol.

Polysubstance Use

- Marijuana and cigar use: significant predictors to hookah smoking

(Shepardson, Hustad. 2016.

Nicotine Tob Res;18:763-9. Haider et al. 2015.

Drug Alcohol Depend;1:359-63; Villanti et al.

2015. *Am J Prev Med*;48:742-6)

- In 3,418 college students, Hookah/marijuana/ LCC co-users:

- Past 4 months: 11.3%

- Past 30 days: 9.1%

(Haardorfer et al. 2016. *Addict Behav*; 64)



Hookah Smoking Epidemic

- Flavored tobacco product
- Unregulated (May 5th, 2016)
 - Accessibility/ affordability
 - Aggressive media and marketing
- Understudied
 - Reduced harm perception
 - Little is known



FDA RULES FOR HOOKAH AND PIPE TOBACCO SALES

Are you taking the necessary steps to prevent underage tobacco use?



Check photo ID of everyone under age 27 who attempts to purchase hookah tobacco or pipe tobacco.



Only sell hookah tobacco or pipe tobacco to customers age 18 and older.*



Do NOT give away free samples of hookah or pipe tobacco, including any of their components or parts.



Do NOT sell hookah or pipe tobacco in a vending machine unless in an adult-only facility.**

PROVIDED BY THE CENTER FOR TOBACCO PRODUCTS

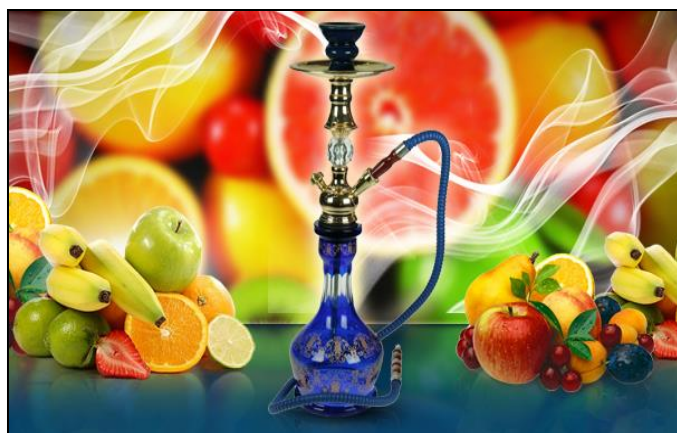
This flyer provides a snapshot of some of the new requirements for hookah and pipe tobacco, effective 08/08/2016. See our website www.FDA.gov/Tobacco for a full list of requirements that may apply to you.



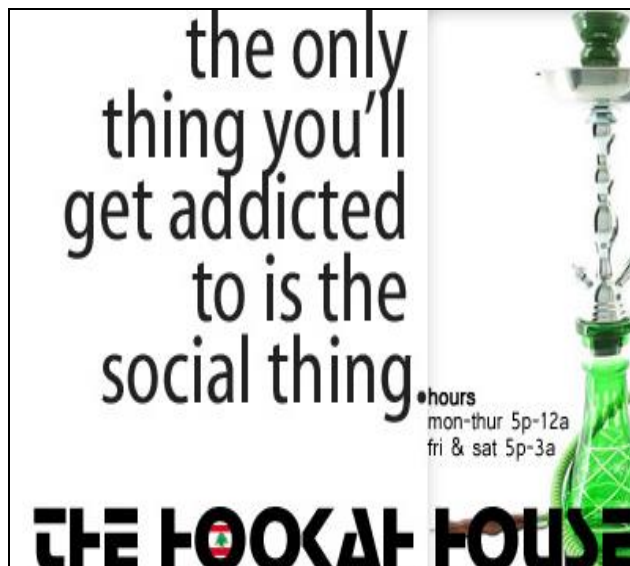
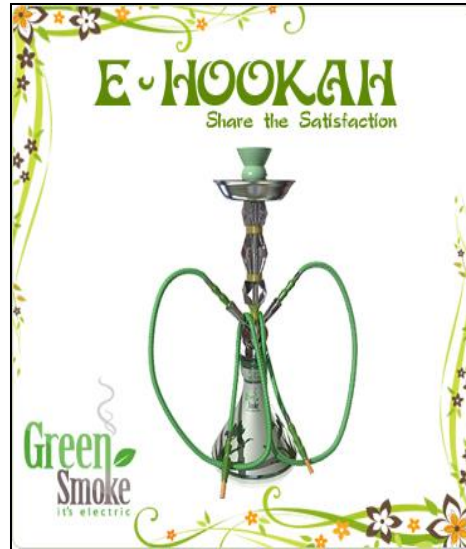
*Retailers must also follow state or local tobacco laws, even if they are more restrictive. For example, in some states the minimum age is 21.

**An adult-only facility is one in which minors are neither present nor permitted to enter at any time.

Hookah Flavored Tobacco



Media & Marketing



Media & Marketing



One big happy family.

#1 Disposable Electronic Hookah

- Industry leading 700 puffs
- 6 second shut-off protection
- Regulated voltage to ensure consistent taste
- Flat button design prevents accidental usage in pocket





VS.



...we'll just be passing it [ehookah] around & enjoying the smell that the vapor leaves in the air because it smells all fruity & candyish & delicious."

"ehookah just sounds like it's better because if you have an ecig, it's still a cigarette in a way. Then you have a hookah pen. It's like hookah, it's kind of cool. It's better"

Reduced Harm Perception

“Hookah will never be addicting because it does not contain nicotine”

“Hookah is harmless because all the smoke passes through the water filter first and then through fruits”

“I hate smoking cigarettes because it has a bad taste to it compared to Hookah which is very flavorful”



Hookah Smoke Exposure

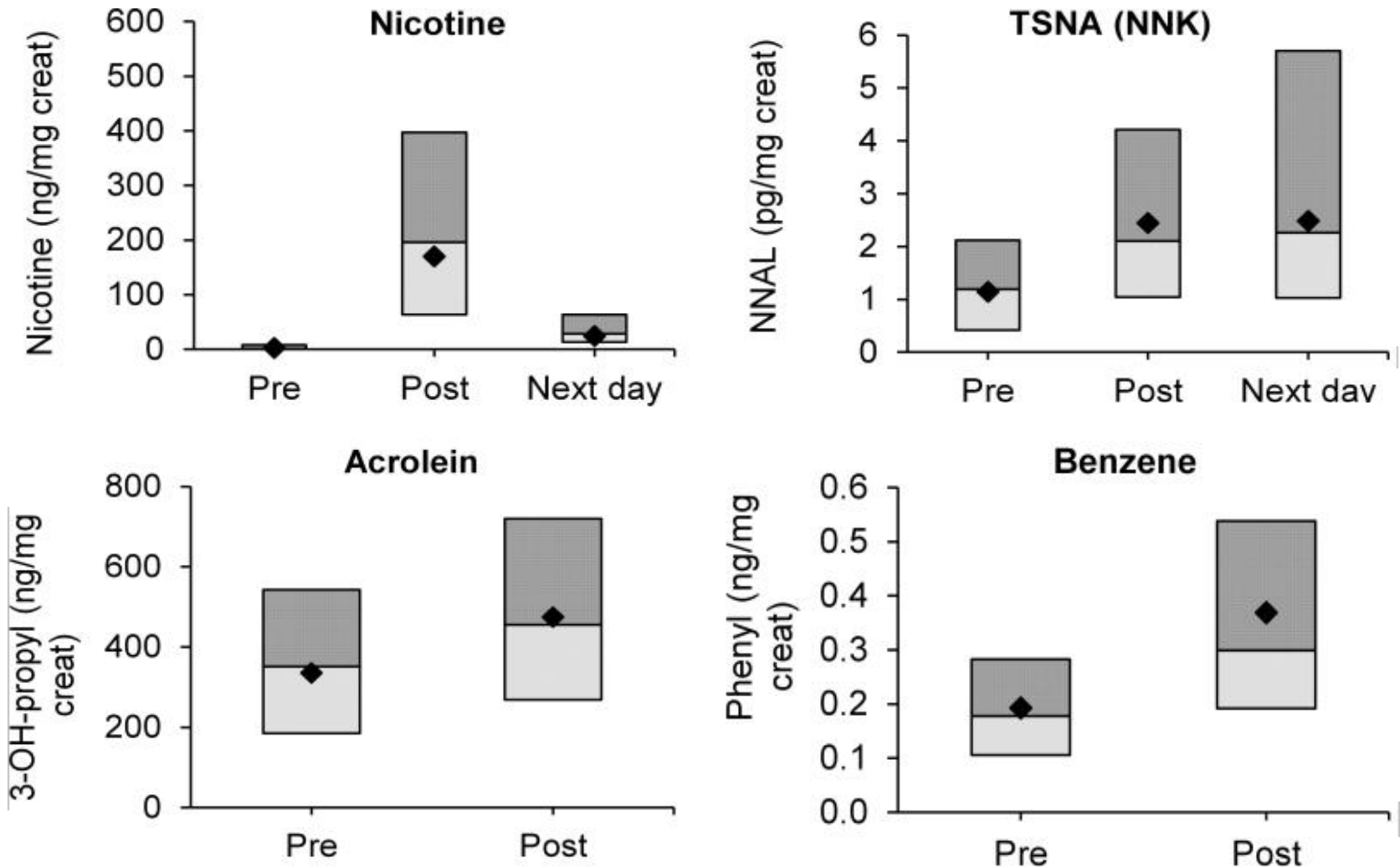


Figure Adapted from: St Helen et al. *Cancer Epidemiol Biomarkers Prev.* 2014;23:1055-66

Hookah Smoke Exposure

Particulate Matter Size and Concentration of Mainstream Smoke

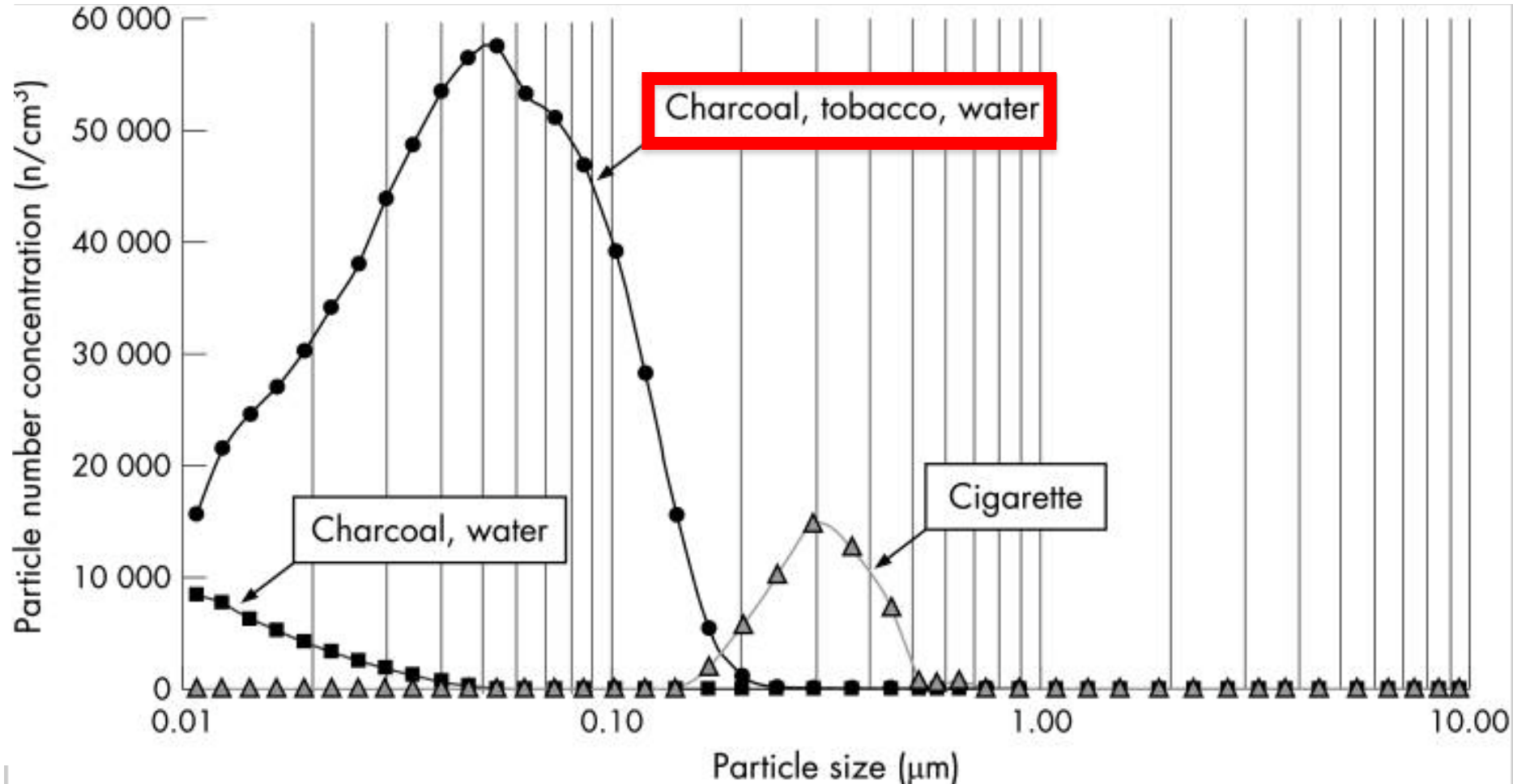


Figure Adapted from: Monn et al. *Tob Control*. 2007;16:390-3.

Hookah Smoke Exposure

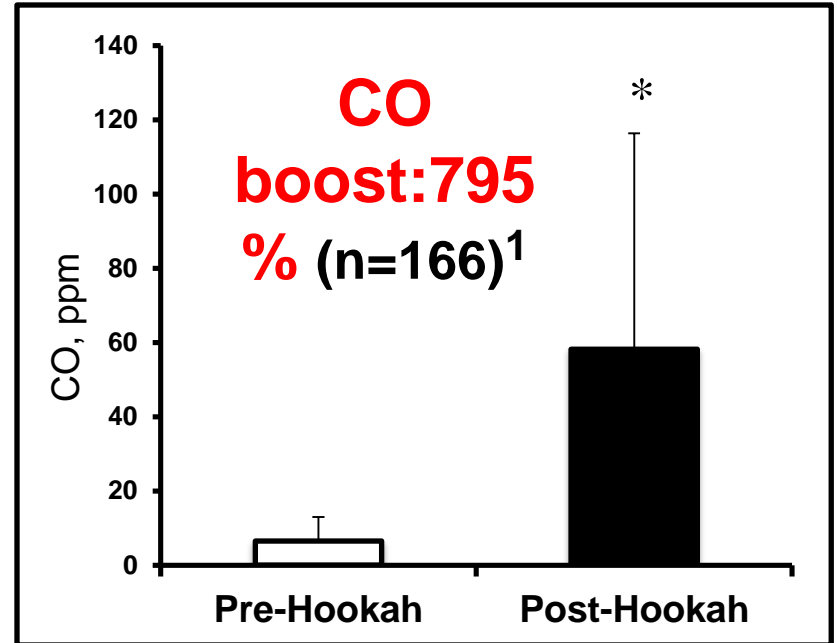
Particulate matter exposure: modifiable risk factor that contributes to cardiovascular morbidity and mortality

Fine Particulate Matter <math><2.5\mu\text{m}</math> (PM _{2.5})	Ultrafine Particulate Matter <math><0.1\mu\text{m}</math> (UFP)
<p>PM_{2.5} Composition:</p> <ul style="list-style-type: none"> Organic Carbon: 25% Elemental Carbon: 3% Sulfates: 19% Nitrates: 23% Metals: 25% Unknown: 5% <p>UFP Composition:</p> <ul style="list-style-type: none"> Organic Carbon: 52% Elemental Carbon: 10% Nitrates: 9% Sulfates: 3% Metals: 17% Unknown: 9% 	
<p>Hookah^a PM_{2.5}: 1,180 $\mu\text{g}/\text{m}^3$ (real time) Air pollution^b: 150 $\mu\text{g}/\text{m}^3$</p>	<p>Hookah UFP^c: 74.4x10⁹ $\mu\text{g}/\text{m}^3$(mainstream) Cigarette smoke^c: 9.24x10⁹ $\mu\text{g}/\text{m}^3$</p>

Figure Adapted from: Araujo et al. *Circ Res.* 2008;102:589-96; ^aZhou et al. *Tob Control.* 2015;24:193-8; ^bBrook et al. *Circ.* 2002;105:1534-6; ^cMonn et al. *Tob Control.* 2007;16:390-3

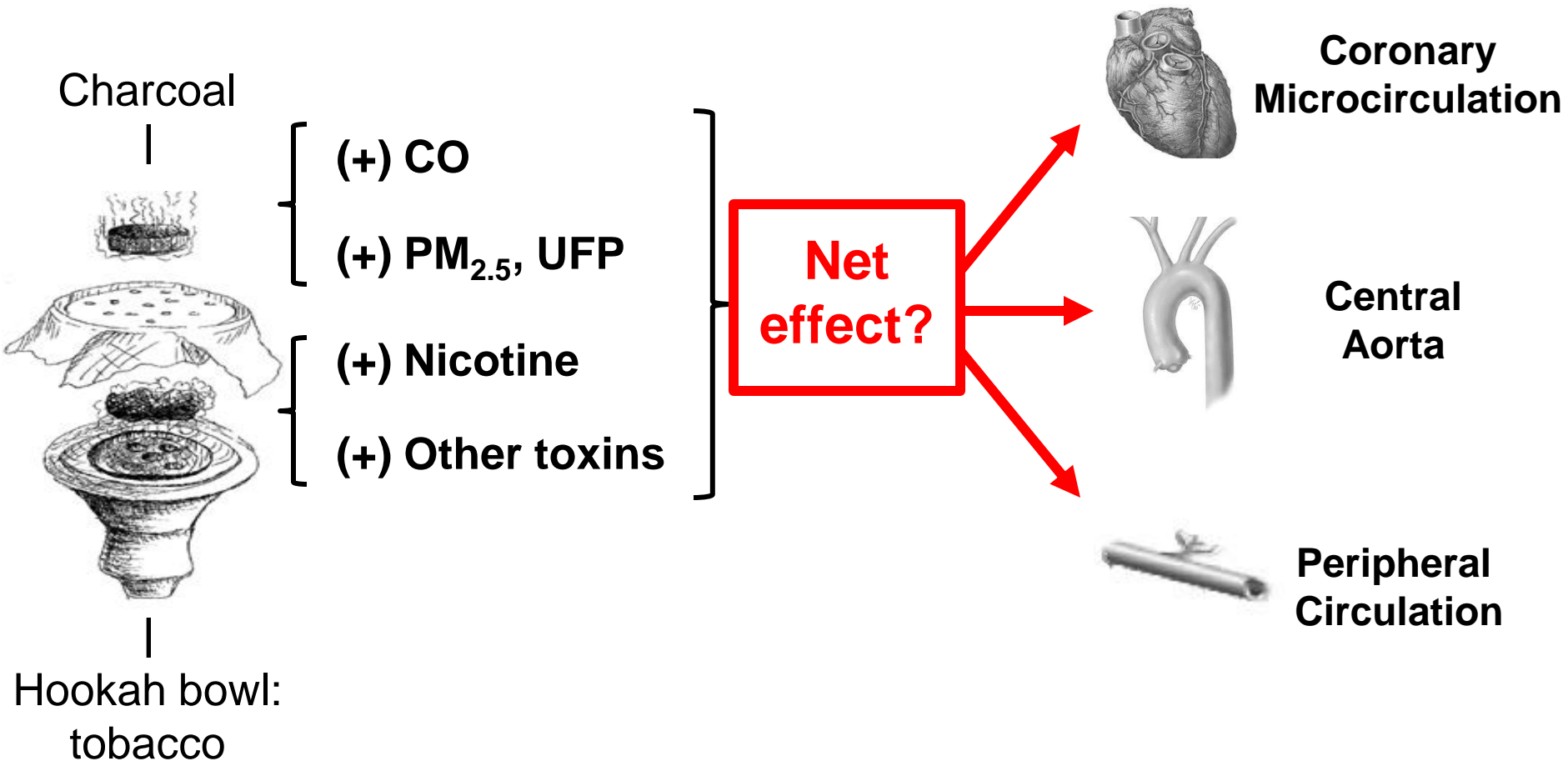
Hookah Smoke Exposure

Carbon monoxide (CO)



Charcoal is responsible for ~90% of the CO produced in mainstream hookah smoke.²

Overview of Hookah Studies



Objective: To determine the net acute effect of hookah smoking on myocardial blood flow, central aorta, and peripheral circulation

Hookah Smoking Chamber



Cedars-Sinai Medical Center

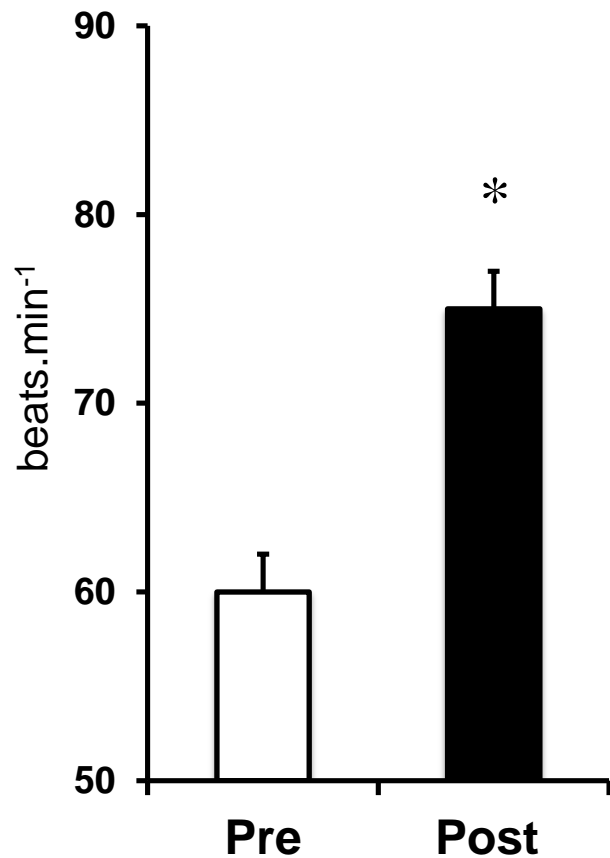
Hypertension & Vascular Biology Clinical Research Center

Subject Characteristics (n=28)

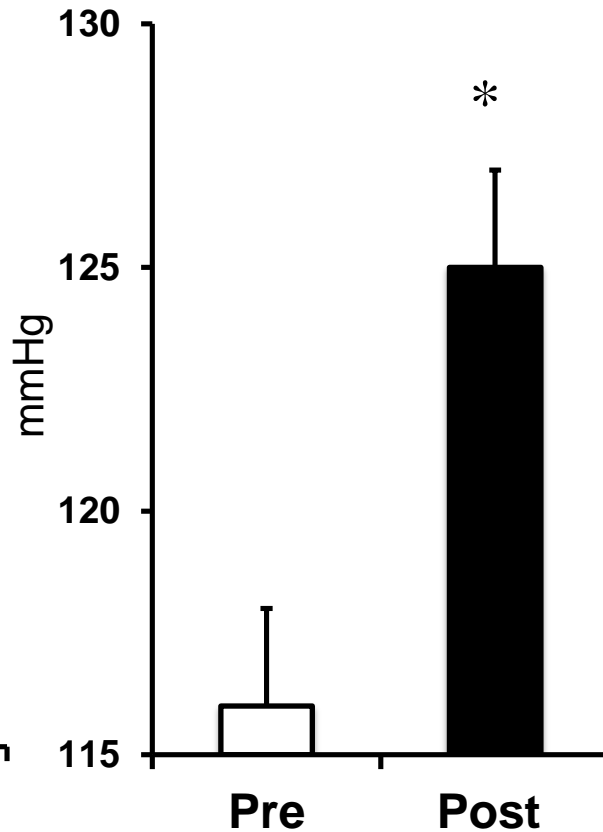
Variable	N or mean \pm SD
Female/ Male	8/20
Age, years	27 \pm 5
Body Mass Index, kg·m ²	25.0 \pm 4.0
Race/Ethnicity	
Non-Hispanic White	9
Non-Hispanic Black	14
Hispanic	1
Asian	1
Native Hawaiian/ Pacific Islander	1
Middle-Eastern Origin	2
Level of Education Attained	
High school	6
College	20
Graduate	2
Hookah Smoking History	
Number of Hookah Sessions per week	2 \pm 2
Session Duration, minutes	102 \pm 60
Age of Hookah Smoking Onset, years	
< 17	5
18-24	19
25-29	3
30-39	1

Hookah Smoking and Myocardial Oxygen Demand (MVO₂)

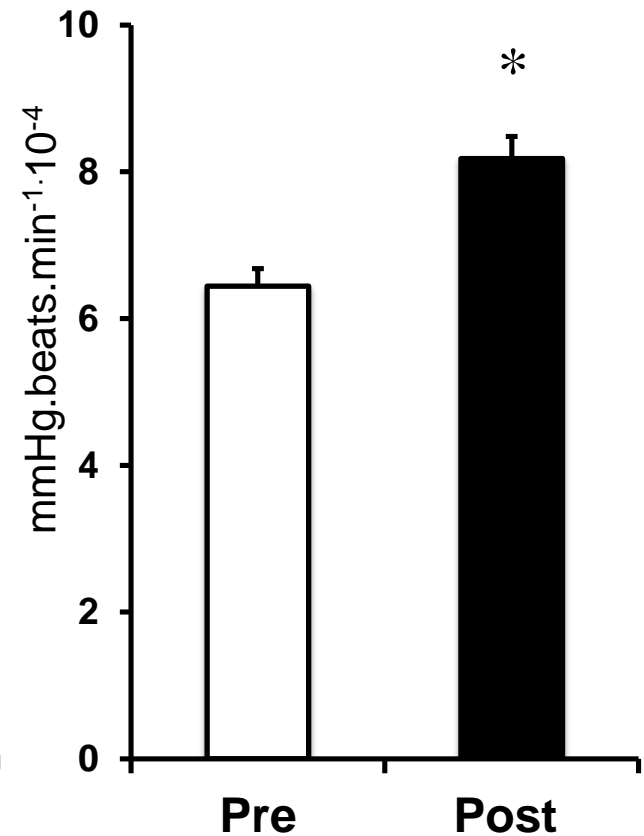
Heart Rate



Systolic BP

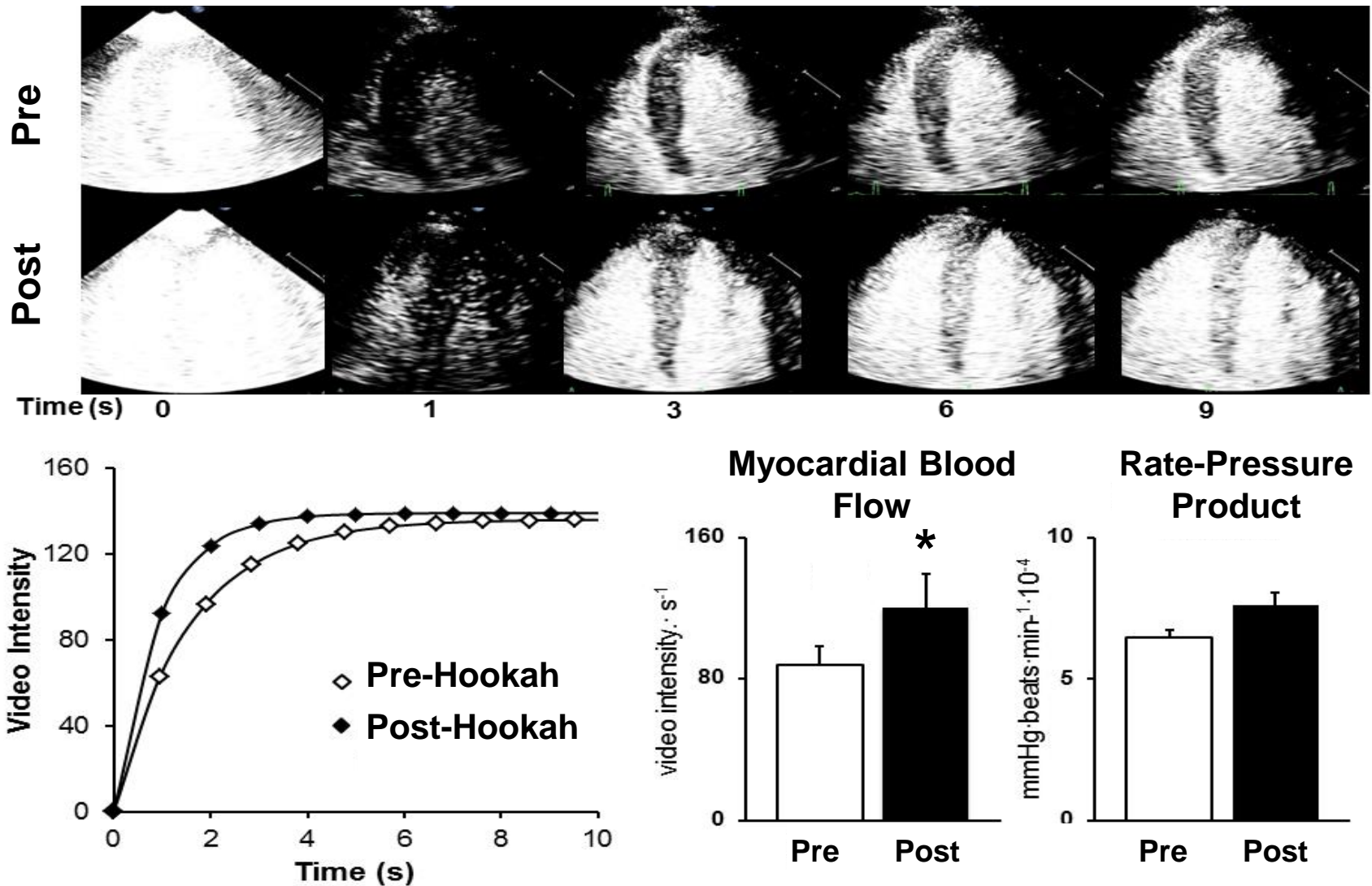


MVO₂

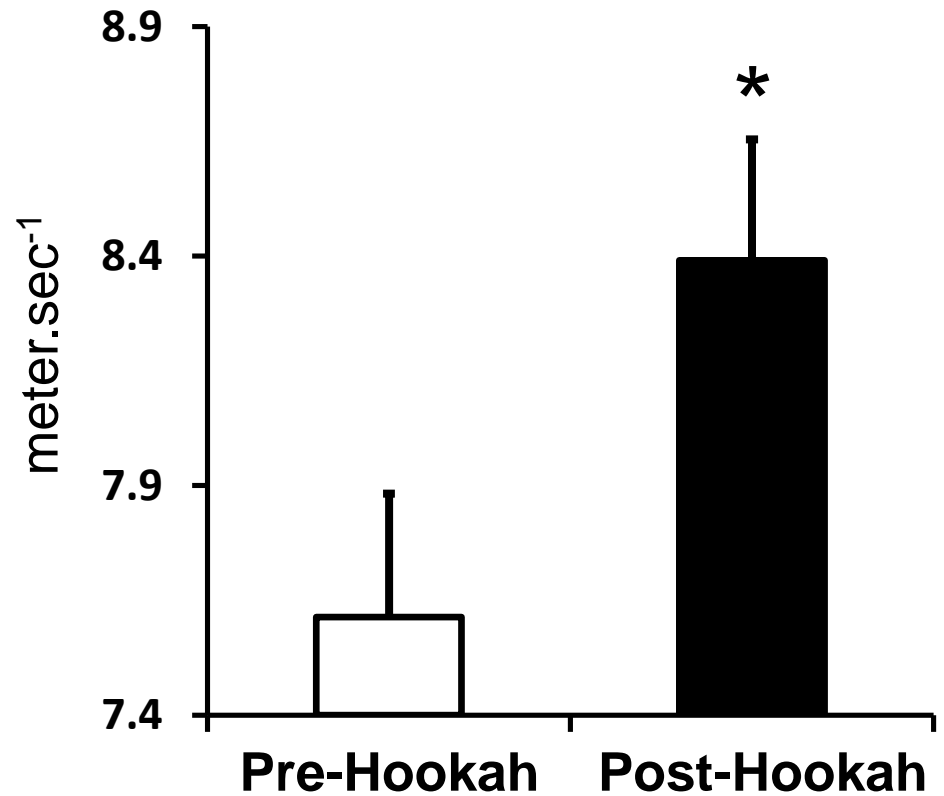
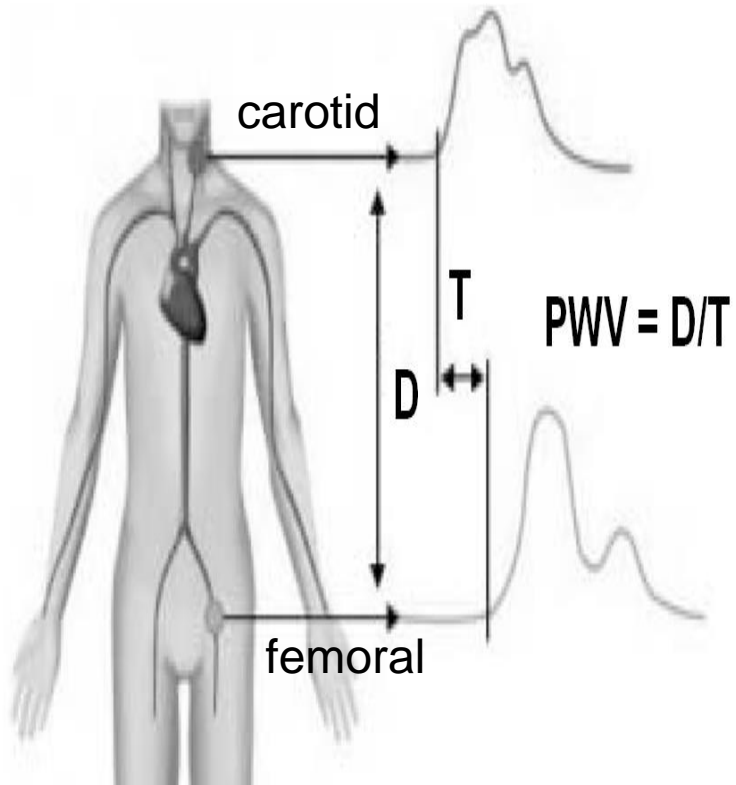


* Indicates P < 0.05

Hookah Smoking and Myocardial Blood Flow

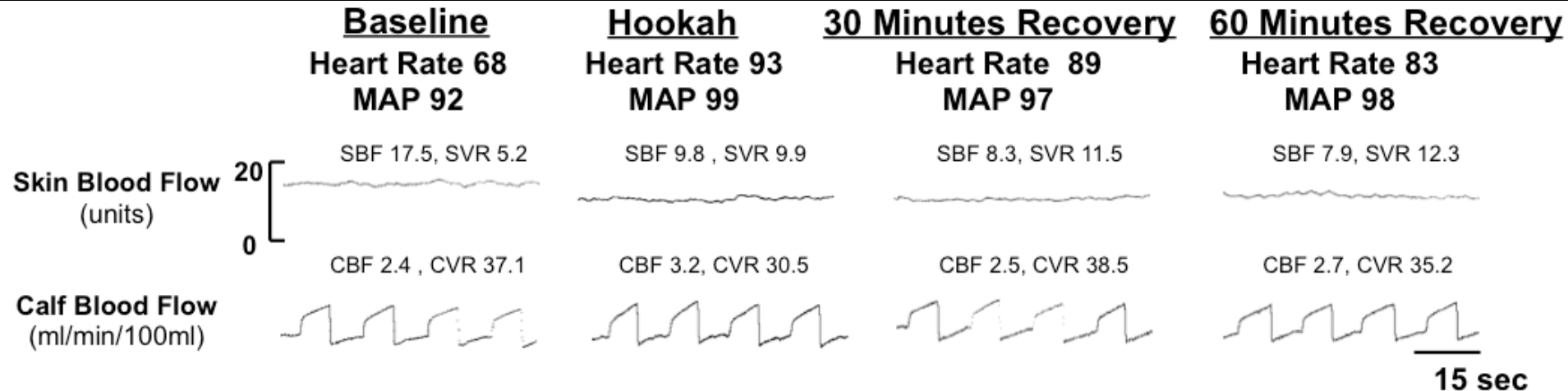


Hookah Smoking and Central Aorta

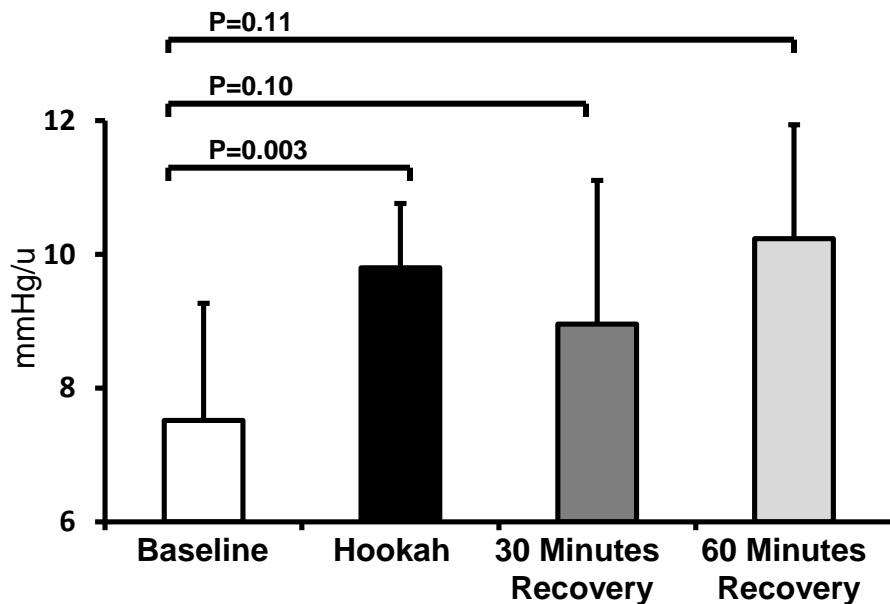


* Indicates P < 0.05

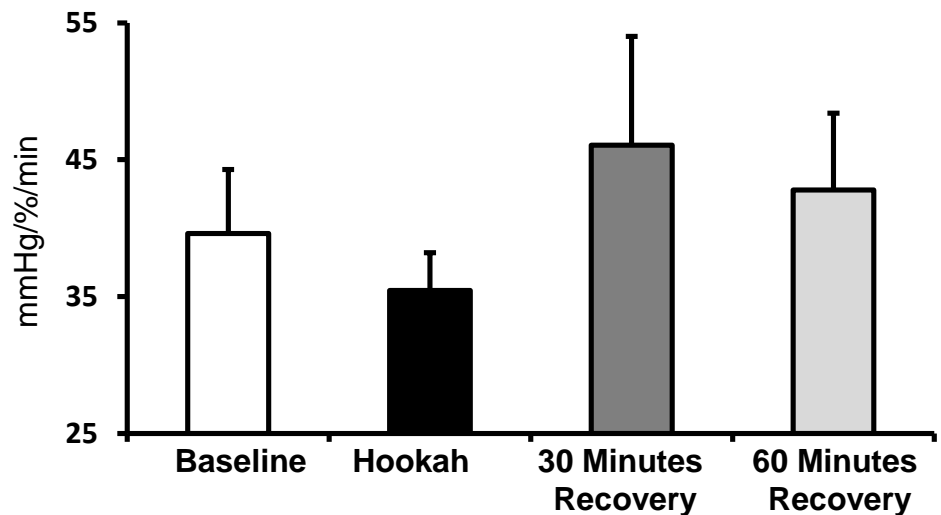
Hookah Smoking and Peripheral Circulation



Skin Vascular Resistance



Calf Muscle Vascular Resistance



Health effects associated with waterpipe smoking.

El-Zaatari ZM¹, Chami HA², Zaatari GS¹.

Acute Effects

- **Cardiovascular:**
 - Increased heart rate
 - Increased blood pressure
- **Respiratory:**
 - Impaired pulmonary function
 - Decreased exercise capacity
 - Larynx and voice changes
- **Carbon monoxide intoxication**

Chronic Effects

- **Cardiovascular:**
 - Ischemic heart disease
- **Respiratory:**
 - Impaired pulmonary function
 - Chronic obstructive lung disease
 - Larynx and voice changes
- **Cancer:**
 - Lung
 - Esophageal
 - Gastric
- **Low birth weight**
- **Periodontal disease**
- **Lower bone density, high fracture risk**

Conclusion

- Advocate for more research: extent to which Hookah smoking negatively affects human health is not well known
- Policy regulation: flavored hookah tobacco, charcoal and water
- Dissemination of findings to the public, particularly to adolescents and young adults

Thank you

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