Funded by the Bloomberg Initiative for Tobacco Control

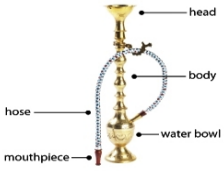
Secondhand Smoke Exposure in Water Pipe Venues in Turkey, Russia, and Egypt

Katherine Moon[1], Hoda Magid[1], Christine Torrey[1], Jolie Susan[1], Vladimir Levshin[2], Aslı Çarkoğlu[3], Ghada Nasr Radwan[4], Maha El-Rabbat[4], Joanna Cohen[1], Paul Strickland[1], Salahaddin Abubaker[1], Ana Navas-Acien[1], Patrick Breysse[1]

[1]Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; [2]Russian Cancer Research Center, Moscow, Russia; [3]Kadir Has University, Istanbul, Turkey; [4]Cairo University, Faculty of Medicine, Cairo, Egypt

BACKGROUND

- Growing prevalence worldwide of water pipe smoking (also known as hookah, nargile, shisha)
- Most tobacco control policies exempt water pipe venues
- Pervasive belief that water pipe smoking is less harmful than cigarette smoking



- Laboratory studies, including smoking machines and controlled human experiments, suggest that the composition of water pipe secondhand smoke differs from cigarettes and may contain more toxicants
- Few real-world studies of water pipe venues and their employees have been conducted

METHODS

- **Study Design:** Cross-sectional surveys of water pipe venues and their employees in 3 countries with a high prevalence of water pipe smoking between January 2013 and April 2014:
  - Istanbul, Turkey
  - Moscow, Russia
  - Cairo, Egypt
- **Venue Selection:** Venues were selected from neighborhoods with a high density of venues and were required to have one non-smoking employee. Venue and employee participation rates were 32-34% and 95-96%, respectively.
- **Venue Observations:** Fieldworkers observed venue characteristics during 2 15-minute periods during peak business activity.
- **Venue Questionnaire**
- **Venue Air Monitoring:** >24-hour continuous $PM_{2.5}$, NNK, and CO, 3-day nicotine, & 1-hour continuous PAHs during peak business activity.
- **Employee Questionnaire**
- **Employee Biomarkers**: Tobacco-specific, combustion, and carcinogen biomarkers of secondhand smoke.

Secondhand Smoke Constituents Measured in Air and Exposure Biomarkers Measured in Venue Employees

Air Samples →	→ Exposure Biomarkers (*Media*)	
Nicotine	Nicotine *(hair)*	Cotinine *(urine, saliva)*
Nicotine-derived Nitrosamine ketone (NNK)	Nicotine-derived Nitrosamine alcohol (NNAL) *(urine)*	
Carbon monoxide (CO)	Carbon monoxide (CO) *(exhaled breath)*	
Particulate matter <2.5 μm ($PM_{2.5}$)		
Polycyclic aromatic hydrocarbons (PAHs)	1-hydroxypryene (1-OHPG) *(urine)*	

PRELIMINARY RESULTS

Venue Characteristics

	Egypt (N=20)	Russia (N=17)	Turkey (N=9)
Indoor smoke-free policy			
No policy	95%	77%	0%
Allowed in some indoor areas	5%	24%	33%
Not allowed indoors, not enforced	0%	0%	22%
Not allowed indoors, enforced	0%	0%	44%
% Customers smoke water pipe inside			
<24%	35%	82%	56%
25-49%	40%	18%	44%
>50%	25%	0%	0%
Observations during peak activity			
# People, mean (SD)	23 (11)	22 (13)	19 (11)
# Cigarette smokers, mean (SD)	6 (2)	4 (2)	5 (5)
# Water pipe smokers, mean (SD)	7 (5)	2 (2)	5 (6)

SD, standard deviation

Employee Characteristics

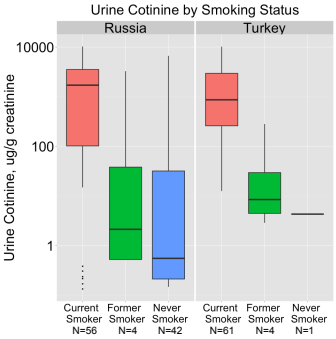
	Egypt (N=106)	Russia (N=104)	Turkey (N=71)
Age, mean (SD)	32 (13)	35 (11)	34 (13)
Male, %	98%	50%	90%
< high school education, %	59%	54%	61%
# hours worked/week, mean (SD)	79 (18)	47 (13)	64 (16)
Current water pipe smoker[1], %	70%	25%	65%
Smoking Status[2], %			
Current Smoker	84%	55%	92%
Former Smoker	5%	4%	5%
Never Smoker	11%	41%	2%

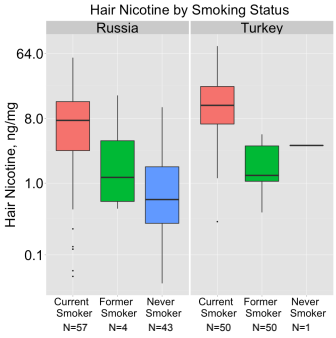
SD, standard deviation

[1]Reported in the past 3 months smoking daily, <daily, or "just a few puffs"

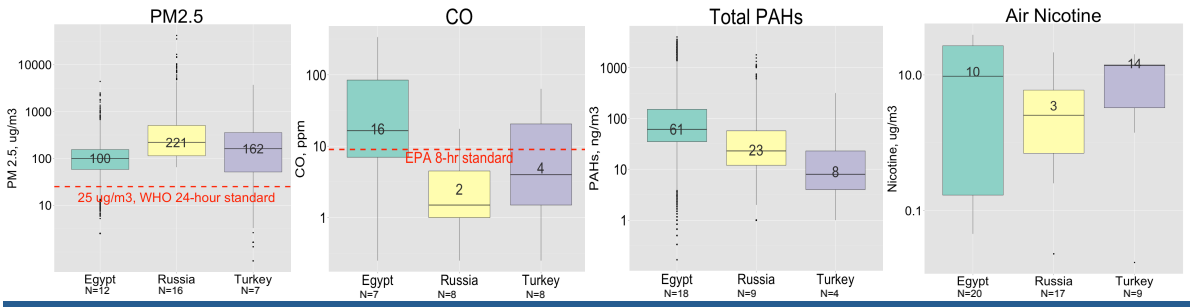
[2]Reported tobacco use ever, in past year, and in past 3 months (including cigarette, water pipe, pipe, chewing tobacco, and nicotine replacement)

Biomarkers of Secondhand Smoke





Secondhand Smoke Constituents in Air, by Country



CONCLUSIONS

- Very high concentrations of CO, $PM_{2.5}$, PAHs, and air nicotine in water pipe venues
- Non-smokers had elevated levels of tobacco-specific biomarkers (cotinine, nicotine) as well as 1-OHPG, a biomarker of carcinogenic PAHs (not shown)
- Compared to employees of bars and nightclubs[3], nonsmoking employees of water pipe venues had higher median hair nicotine in Turkey and lower in Russia

The combined active smoking status and occupational exposure of water pipe employees resulted in extremely high levels of exposure to tobacco smoke. **Water pipe venues should be included in smoke-free legislation.**

Reference: (3) Jones et al. 2013 *Tobacco Control*