

## Secondhand Smoke from Marijuana: The Return of a Familiar Problem

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## *Back to the Future: CA, 2017?*



Photo: Brennan Linsley / Associated Press

"Partygoers dance and smoke pot April 19, the first of two days of the annual 4/20 marijuana festival in Denver. The 4/20 event was the first one since Colorado legalized recreational marijuana in January."

## Secondhand smoke (SHS)

- Smoking causes over 140,000 cardiovascular deaths in the US per year
- SHS is estimated to cause ~50,000 US deaths/year, mostly from cardiovascular disease
- Smoking bans in public places lead to reduction in frequency of heart attacks

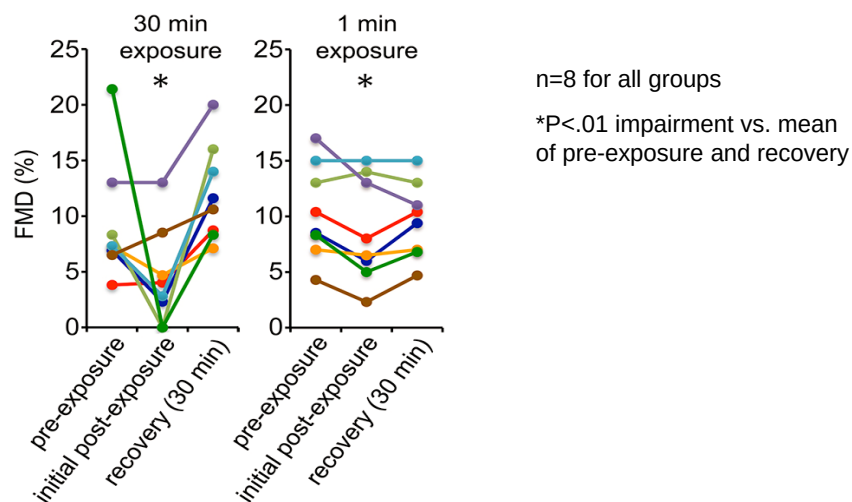
Tobacco SHS exposure impairs ability of arteries to **vasodilate** when they need to pass more blood

(**Vasodilation**: Arteries grow in diameter when necessary)

Important: Impairment is temporary, but repeated exposures lead to **long-term** impairment

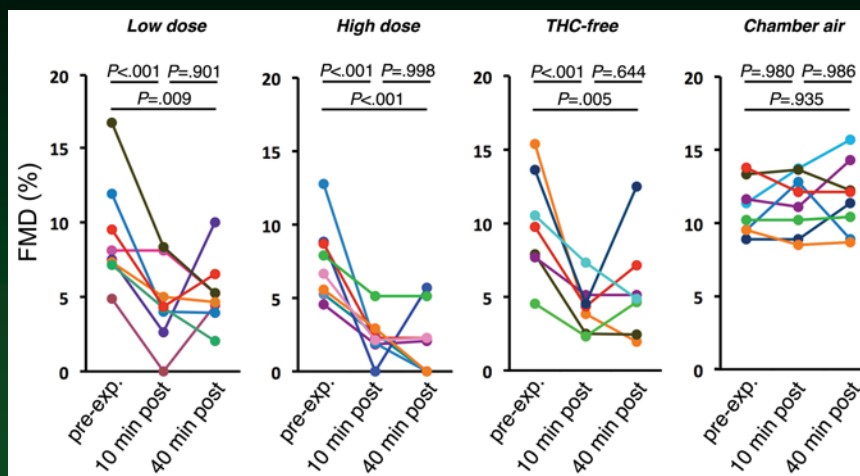


## 1 minute of SHS (tobacco) exposure was enough to impair vascular endothelial function



Pinnamaneni et al., 2014, Nicotine Tob. Res. 16:584-590

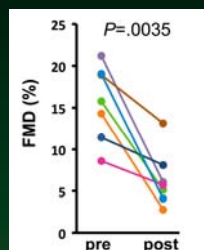
## Marijuana SHS for 30 minutes impaired FMD (American Heart Association, Chicago, Nov. 2014)



low dose =  $\sim 200 \mu\text{g}/\text{m}^3$  particles; high dose =  $\sim 670 \mu\text{g}/\text{m}^3$  particles (starting concentrations)

**“30 minutes is kind of long, how about shorter times?”**

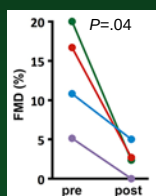
marijuana 1 min



59% drop in FMD

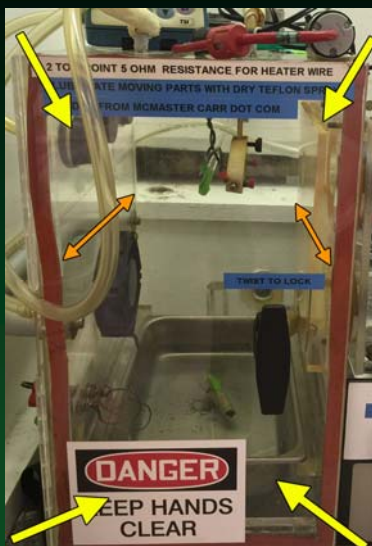
**Marijuana SHS for 1 minute lowered FMD**

**“Could the impairment in FMD be caused by smoke from the burning paper, rather than tobacco and marijuana?”**



**SHS from marijuana without paper still impairs FMD**

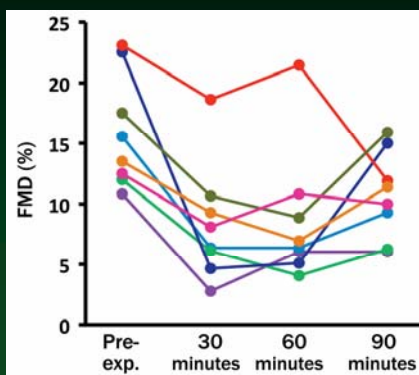
**“They totally smoke out the rats”**



**The smoke was invisible in the exposure chamber**

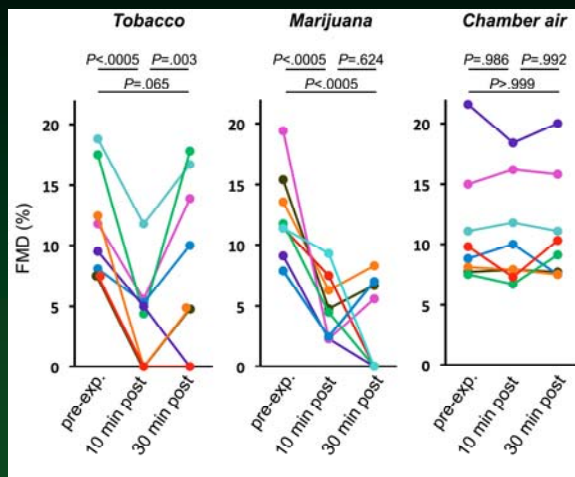
**“How long does it take for FMD to recover?”**

**1 minute exposure (THC-free)**



**Marijuana SHS for 1 minute lowered FMD for at least 90 minutes**

### “How do marijuana and tobacco compare in impairment of FMD?”



**Impairment from one minute of marijuana SHS persists longer than impairment from tobacco SHS**

### Summary of marijuana results

Wang et al., 2016, J Am Heart Assoc 5:e003858

**Marijuana SHS for one minute substantially impairs vascular endothelial function in rats.**

**Neither THC nor paper smoke are required for marijuana SHS to impair vascular function.**

**...nicotine is not required for impairment of vascular function by smoke.**

**One minute of marijuana SHS exposure impairs vascular function for at least 90 minutes, longer than impairment from tobacco SHS.**