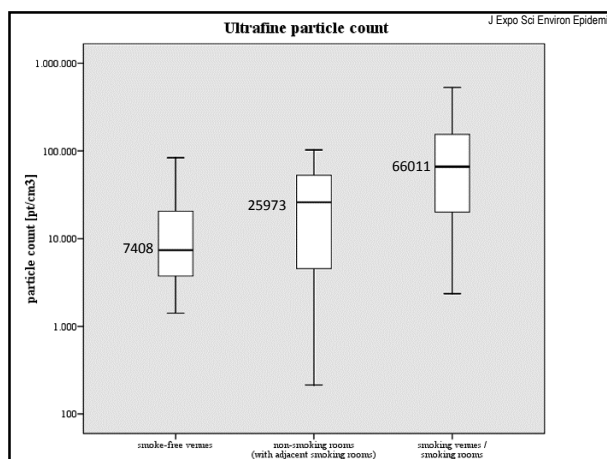


Dangerous contamination of inns even in designated non-smoking rooms

Neuberger M^{1,2}, Moshhammer H², Schietz A²

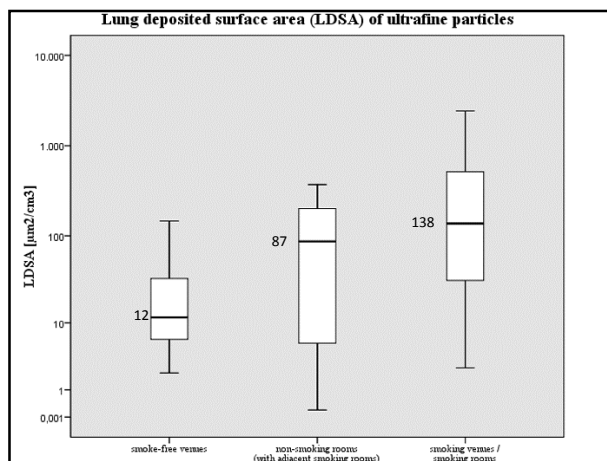
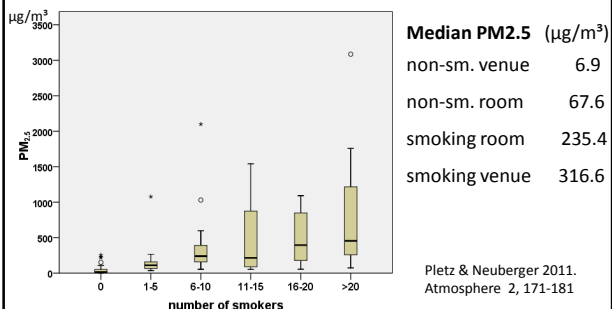
¹Austrian Academy of Science, Commission for Climate & Air Quality

²Medical University of Vienna, Institute for Environmental Health



First study in Vienna hospitality venues (Feb – Oct 2010)

112 cafes, restaurants, bars and discotheques in central districts
Chance sampling during busy hours in central guest area **without prior notice**, usually while ordering and having a drink, placing OPC 1.108, Grimm® on table. Omission of open doors, fireplaces and immediate vicinity of active smokers.



Second study in Vienna hospitality venues (Nov 2010 – June 2011)

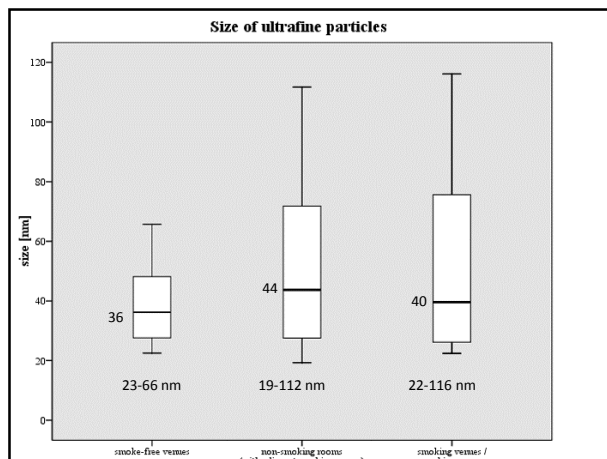
16 cafés, 51 bars & pubs, 14 restaurants, 7 discos, in districts 1,3,4,6-9,15,18-20
Chance sampling during busy hours in central guest area **without prior notice**
22 non-smoking, 20 smoking, 46 mixed (non-smoking adjacent to smoking room (6 non-smoking, 7 mixed excluded because of violations of ban)

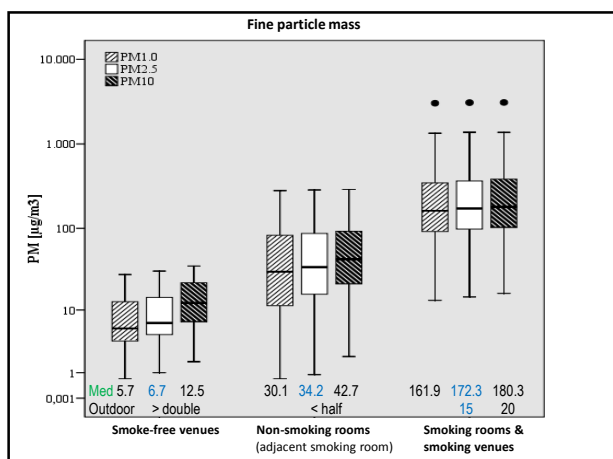
PM (300 nm – 2,500 nm): OPC (1.108, Grimm®);
PN (10 nm – 300 nm): Diffusion Size Classifier (G3_016 miniDiSC®)
Particle diameter, chargeable surface area, LDSA estimated according to ICRP (Asbach et al. 2009)

Median PN (all 134 rooms): 34,075 pt/cm³

PM1.0, PM2.5 and PM10 correlated to PN (Spearman p<0.001) throughout all the inspected locations

Neuberger et al. 2013: J Expo Sci Environ Epidemiol





CONCLUSIONS FOR POLICY

Partial smoking bans failed

Chronic exposure dangerous for healthy persons (waiters)

e.g. doubling lung cancer risk within 8 years

Acute exposure dangerous for risk groups (guests + children)

highest risk for patients with coronary disease or asthma

Separation insufficient, second hand smoke in „smokefree“ rooms

Non-smoking sign pretends a safety, which is not given.

nicotine, cotinine, NNAL in urine of guests (+ children)

guests of non-smoking hotel rooms: 3-ethenylpyridine

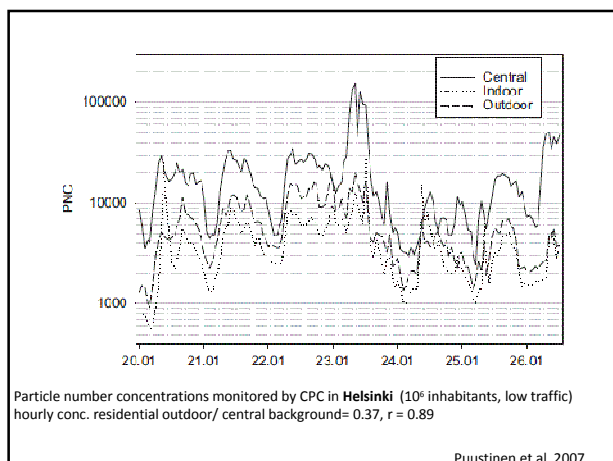
Matt et al. 2013

Cardiac, cerebrovascular & respiratory disease decrease post-ban

Crystal & Glantz 2012

Hospital admissions for asthma decrease post-ban

in children (Millet et al. 2013) & in adults (Sims et al. 2013)



CONCLUSIONS

Fine particle mass, UF particle number & surface increase with number of smokers

Outdoor PM_{2.5} concentrations in busy streets are exceeded ~10-fold in smoking rooms
~ 2-fold in nonsm. rooms

Compared to median concentrations in non-smoking venues :

PM_{2.5} outdoors ~ 2-fold, nonsm. room ~ 5-fold, smoking room ~ 25-fold
particle surface: nonsm. room ~ 7-fold, smoking room ~ 11-fold
particle number: nonsm. room ~ 3-fold, smoking room ~ 9-fold

Significant correlations: PM_{2.5} outdoor / non-smoking venue

PN, LDSA, PM_{2.5} smoking room / nonsm. room

J Expo Sci Environ Epidemiol 2013, doi:10.1038/jes.2013.22

www.nature.com/jes/journal/vaop/ncurrent/full/jes201322a.html

Highest correlation of air nicotine with particle surface (Moshhammer & Neuberger:
Atmos Environ 37: 1737-44)

PM1 (PM2.5) most discriminative (Pletz & Neuberger 2011. Atmosphere 2: 171-181)