

Lifetime cannabis exposure and small airway function in a population-based cohort study

Hua Shin Tan, Helena M. McAnally, Jack Dummer, Robert J Hancox

Online supplement

Supplementary Table 1: Post-bronchodilator IOS values at age 45 years

	Women			Men		
	<i>n</i>	Mean	95% CI	<i>n</i>	Mean	95% CI
R5	440	4.15	4.02 4.29	453	3.68	3.56 3.79
R20	440	3.54	3.43 3.65	453	3.22	3.12 3.32
R5-R20	440	0.61	0.55 0.68	453	0.46	0.41 0.50
X5	439	-2.16	-2.66 -1.64	452	-1.37	-1.61 -1.13
Ax	434	3.49	3.18 3.80	444	2.38	2.10 2.67
Fres	438	11.40	11.07 11.75	451	10.32	10.01 10.64

Note: means are geometric means of raw IOS values. The *n* values differ slightly because of missing data. R5=resistance at 5Hz, R20=resistance at 20Hz, R5-R20= difference between R5 and R20, X5= reactance at 5Hz, AX= area under the reactance curve between 5 and Fres, Fres= Resonant frequency.

Supplementary Table 2: Pre-bronchodilator IOS values at age 45 years by smoking status.

	Women			Men				
	<i>n</i>	Mean	95% CI		<i>n</i>	Mean	95% CI	
Never smokers								
R5	110	5.02	4.71	5.33	82	4.22	3.87	4.58
R20	110	4.05	3.81	4.30	82	3.47	3.16	3.79
R5-R20	110	0.96	0.80	1.12	82	0.75	0.62	0.89
X5	110	-1.50	-1.64	-1.36	82	-1.05	-1.16	-0.93
Ax	110	6.46	5.39	7.57	81	4.26	3.36	5.20
Fres	110	14.07	13.18	14.97	81	12.97	11.98	13.99
Cannabis users only								
R5	99	5.17	4.79	5.55	145	4.43	4.16	4.70
R20	99	4.18	3.88	4.48	145	3.62	3.42	3.83
R5-R20	99	1.00	0.82	1.17	145	0.82	0.68	0.95
X5	98	-1.57	-1.73	-1.42	145	-1.18	-1.31	-1.06
Ax	98	6.66	5.52	7.85	145	4.67	3.77	5.60
Fres	99	14.57	13.60	15.56	145	12.89	12.16	13.63
Tobacco users only								
R5	40	5.07	4.59	5.57	10	5.56	3.58	7.70
R20	40	4.01	3.65	4.39	10	4.04	3.26	4.85
R5-R20	40	1.05	0.72	1.39	10	1.55	0.06	3.15
X5	40	-1.63	-2.00	-1.26	10	-1.95	-3.45	-0.31
Ax	40	6.93	4.46	9.65	10	9.36	1.22	20.63
Fres	40	14.15	12.62	15.75	10	15.34	10.61	20.80
Cannabis & Tobacco users								
R5	191	5.31	5.02	5.61	217	4.58	4.38	4.78
R20	191	4.23	4.01	4.45	217	3.73	3.57	3.89
R5-R20	191	1.09	0.93	1.25	217	0.85	0.75	0.96
X5	191	-1.66	-1.82	-1.50	217	-1.22	-1.32	-1.11
Ax	188	7.53	6.37	8.75	213	5.02	4.29	5.77
Fres	190	14.36	13.57	15.16	216	13.10	12.43	13.78

Note: means are geometric means of raw IOS values. The *n* values differ slightly because of missing data. R5=resistance at 5Hz, R20=resistance at 20Hz, R5-R20= difference between R5 and R20, X5= reactance at 5Hz, AX= area under the reactance curve between 5 and Fres, Fres= Resonant frequency.

Never smokers did not report any life-time cannabis or tobacco use (joint-years and pack-years both =0)

Supplementary Table 3: Pre- and Post- Salbutamol IOS Spearman Correlations in Women at age 45.

	R5	R20	R5-R20	X5	AX
Pre-Salbutamol (n=436)					
R20	0.85				
<i>p</i>	<0.001				
R5-R20	0.54	0.07			
<i>p</i>	<0.001	0.14			
X5	0.65	0.38	0.68		
<i>p</i>	<0.001	<0.001	<0.001		
AX	0.66	0.26	0.91	0.89	
<i>p</i>	<0.001	<0.001	<0.001	<0.001	
Fres	0.57	0.17	0.92	0.74	0.94
<i>p</i>	<0.001	<0.001	<0.001	<0.001	<0.001
Post-Salbutamol (n=433)					
R20	0.85				
<i>p</i>	<0.001				
R5-R20	0.42	-0.05			
<i>p</i>	<0.001	0.31			
X5	0.44	0.26	0.42		
<i>p</i>	<0.001	<0.001	<0.001		
AX	0.51	0.16	0.78	0.69	
<i>p</i>	<0.001	<0.001	<0.001	<0.001	
Fres	0.43	0.01	0.91	0.56	0.89
<i>p</i>	<0.001	0.81	<0.001	<0.001	<0.001

Coefficient *rho* statistics are for correlations between log transformed variables.

R5=resistance at 5Hz, R20=resistance at 20Hz, R5-R20= difference between R5 and R20, X5= reactance at 5Hz, AX= area under the reactance curve, Fres= Resonant frequency.

Supplementary Table 4: Pre- and Post- Salbutamol IOS Spearman Correlations in Men at age 45.

	R5	R20	R5-R20	X5	AX
Pre-Salbutamol (n=449)					
R20	0.88				
<i>p</i>	<0.001				
R5-R20	0.53	0.12			
<i>p</i>	<0.001	0.01			
X5	0.62	0.38	0.65		
<i>p</i>	<0.001	<0.001	<0.001		
AX	0.60	0.24	0.90	0.86	
<i>p</i>	<0.001	<0.001	<0.001	<0.001	
Fres	0.52	0.15	0.93	0.72	0.95
<i>p</i>	<0.001	<0.001	<0.001	<0.001	<0.001
Post-Salbutamol (n=443)					
R20	0.93				
<i>p</i>	<0.001				
R5-R20	0.33	-0.01			
<i>p</i>	<0.001	0.85			
X5	0.34	0.20	0.45		
<i>p</i>	<0.001	<0.001	<0.001		
AX	0.39	0.12	0.80	0.79	
<i>p</i>	<0.001	0.01	<0.001	<0.001	
Fres	0.30	0.01	0.89	0.61	0.93
<i>p</i>	<0.001	0.90	<0.001	<0.001	<0.001

Coefficient *rho* statistics are for correlations between log transformed variables.

R5=resistance at 5Hz, R20=resistance at 20Hz, R5-R20= difference between R5 and R20, X5= reactance at 5Hz, AX= area under the reactance curve, Fres= Resonant frequency.

Supplementary Table 5: Adjusted associations of cannabis and tobacco with post-bronchodilator IOS measures for the whole sample.

		IOS Measures ^a					
		R5	R20	R5-R20	X5	AX	Fres
<i>n</i>		874	874	874	874	859	862
Joint Years	β	0.067	0.056	0.026	0.020	0.056	0.069
	95% CI	-0.003-0.138	-0.018-0.130	-0.039-0.092	-0.053-0.092	-0.014-0.125	-0.001-0.139
	<i>p</i>	0.061	0.137	0.431	0.594	0.114	0.055
Pack Years	β	0.111	0.086	0.070	0.086	0.078	0.089
	95% CI	0.041-0.182	0.12-0.160	0.004-0.135	0.013-0.158	0.008-0.147	0.018-0.159
	<i>p</i>	0.002	0.022	0.037	0.021	0.028	0.014
Interaction term ^b	<i>p</i>	0.079	0.096	0.598	0.559	0.369	0.204

^a All IOS measures are log-transformed and analyses are adjusted for use of both substances and also adjusted for sex, BMI, and height; bolded values are statistically significant. β values are standardised regression coefficients, which represent the standard deviation difference in IOS measure associated with each standard deviation change in joint- or pack-years.

^b Interaction term p-values are for joint years by sex in the adjusted model for each IOS measure tested for after the adjusted model was run

Supplementary Table 6: Adjusted associations of cannabis and tobacco with post-bronchodilator IOS measures stratified by sex.

		IOS Measures ^a					
		R5	R20	R5-R20	X5	AX	Fres
Women	n	433	433	433	433	427	428
Joint-years	β	0.134	0.152	-0.013	0.074	0.094	0.082
	95% CI	0.009-0.260	0.021-0.283	-0.146-0.120	-0.061-0.208	-0.025-0.214	-0.047-0.210
	p	0.036	0.023	0.848	0.281	0.121	0.212
Pack-years	β	0.118	0.053	0.157	0.034	0.062	0.134
	95% CI	0.004-0.232	-0.066-0.171	0.036-0.277	-0.088-0.156	-0.045-0.169	0.018-0.251
	p	0.042	0.384	0.011	0.582	0.257	0.024
Men	n	441	441	441	441	432	434
Joint-years	β	0.038	0.013	0.047	-0.006	0.038	0.064
	95% CI	-0.048-0.124	-0.077-0.104	-0.019-0.114	-0.091-0.079	-0.050-0.125	-0.019-0.146
	p	0.382	0.772	0.161	0.891	0.398	0.130
Pack-years	β	0.102	0.101	0.015	0.115	0.086	0.058
	95% CI	0.011-0.192	0.005-0.197	-0.055-0.085	0.026-0.205	-0.007-0.178	-0.030-0.145
	p	0.028	0.038	0.678	0.012	0.070	0.194

^a All IOS measures are log-transformed and analyses are adjusted for use of both substances and also adjusted for BMI and height; bolded values are statistically significant. β values are standardised regression coefficients, which represent the standard deviation difference in IOS measure associated with each standard deviation change in joint- or pack-years.

Supplementary Table 7: Adjusted associations of cannabis use with pre-bronchodilator IOS measures among the sub-sample who never used tobacco.

Pre-bronchodilator		IOS Measures ^a					
		R5	R20	R5-R20	X5	AX	Fres
	<i>n</i>	425	425	425	424	423	424
Joint Years	β	0.084	0.032	0.114	0.010	0.112	0.148
	95% CI	-0.094-0.261	-0.159-0.223	-0.056-0.284	-0.143-0.164	-0.053-0.277	-0.25-0.320
	<i>p</i>	0.355	0.741	0.187	0.894	0.183	0.094

^a All IOS measures are log-transformed and analyses are adjusted for adjusted for sex, BMI, and height. β values are standardised regression coefficients, which represent the standard deviation difference in IOS measure associated with each standard deviation change in joint- or pack-years.

Supplementary Table 8: Associations of cannabis and tobacco with pre-bronchodilator IOS measures for the whole sample adjusted for childhood and adult socio-economic status.

Pre-bronchodilator		IOS Measures ^a					
		R5	R20	R5-R20	X5	AX	Fres
<i>n</i>		873	873	873	872	864	866
Joint Years	β	0.098	0.073	0.076	0.106	0.122	0.119
	95% CI	0.026-0.170	-0.003-0.148	0.002-0.149	0.038-0.175	0.051-0.193	0.048-0.191
	<i>p</i>	0.008	0.058	0.043	0.002	0.001	0.001
Pack Years	β	0.023	-0.007	0.054	0.043	0.036	0.015
	95% CI	-0.051-0.098	-0.085-0.072	-0.022-0.131	-0.028-0.114	-0.038-0.110	-0.059-0.090
	<i>p</i>	0.540	0.869	0.160	0.236	0.346	0.689

^a All IOS measures are log-transformed and analyses are adjusted for use of both substances and also adjusted for sex, BMI, height, average SES from birth to 15 and SES at age 45; bolded values are statistically significant

Supplementary Table 9: Adjusted associations of cannabis use with pre-bronchodilator IOS measures among the sub-sample who never reported asthma.

Pre-bronchodilator		IOS Measures ^a					
		R5	R20	R5-R20	X5	AX	Fres
	<i>n</i>	603	603	603	602	596	597
Joint Years	β	0.135	0.100	0.111	0.111	0.144	0.156
	95% CI	0.047-0.223	0.004-.0196	0.026-0.197	0.03-0.191	0.063-0.225	0.073-0.239
	<i>p</i>	0.003	0.041	0.011	0.007	0.001	<0.001
Pack-years	β	0.025	0.015	0.041	0.002	0.016	0.018
	95% CI	-0.062-0.113	-0.081-0.110	-0.044-0.126	-0.077-0.082	-0.066-0.098	-0.065-0.101
	<i>p</i>	0.571	0.763	0.342	0.952	0.694	0.671

^a All IOS measures are log-transformed and analyses are adjusted for adjusted for sex, BMI, and height as well as both substances; bolded values are statistically significant.