

Online Tables

Online Table O1: Baseline characteristics of all SAPALDIA participants and of subjects included in current analysis

Baseline	SAPALDIA 1 participants	SAPALDIA 1 & 2 participants
Characteristics		(included in current analysis)
Total	n=8666	n=5490
Women (%)	51.6	0.5289617
Mean (SD) age (yrs)	41.0 (11.7)	40.9 (11.4)
Mean BMI (SD) (kg/m²)	23.9 (3.8)	23.7 (3.6)
Mean FEV1 (SD) (l/s)	3.54 (0.84)	3.57 (0.82)
Mean FVC (SD) (l)	4.48 (1.04)	4.51 (1.02)
Mean FEV1/FVC (SD)	0.79 (0.08)	0.79 (0.07)
Atopic (%)¹	23.2	22.9
Severe respiratory infection as an infant (%)	7.7	8.3
No professional education (%)	16.2	13.1
Exposed to dust and fumes at work (%)	31.3	30.2
Never smokers² (%)	44	50.7
Former smokers² (%)	22.9	23.4
< 15 pack-years³	62.6	64.5
≥15 pack-years³	32.8	30.9
Current smokers² (%)	33.1	29
< 15 pack-years³	39.3	40.6
≥15 pack-years³	54.5	52.4
Asthma⁴	7.9	7.4
Wheezing without a cold in the 12 months prior to baseline	7.4	6.3

¹ atopy defined as positive skin prick test; available for only n=8326 and 5309 subjects at baseline and follow-up, respectively

² smoking status at baseline: never smokers: <20 packs of cigarettes and <360 g of tobacco in lifetime; former smokers: stopped smoking ≥1 month before baseline examination; current smokers: active smoking at baseline

³ numbers do not add up to 100% due to missing pack-year information

⁴ asthma defined by self-declaration (not confirmed by a doctor)

Online Table O2: Distribution of severity stages of obstruction at follow-up and rates of missings according to baseline severity stage of obstruction

Severity stage of obstruction at baseline examination (n, %)	Severity stage of obstruction at follow-up examination (n, row%)			
	no obstruction	stage I	stage II or more	missing at follow-up*
no obstruction n=7716 (89.0%)	4181 (54.2%)	683 (8.9%)	85 (1.1%)	2767 (35.9%)
stage I n= 757 (8.7%)	106 (14.0%)	294 (38.8%)	56 (7.4%)	301 (39.8%)
stage II or more n= 193 (2.2%)	7 (3.6%)	17 (8.8%)	61 (31.6%)	108 (56.0%)
Total	4294 (49.5%)	994 (11.5%)	202 (2.3%)	3176 (36.6%)

* p_{χ^2} for difference in missing rates <0.001

Online table O3 Lung function values at baseline and follow-up according to category of change in severity of obstruction¹

	Persistently normal n=4181	Incident stage I n=683	Incident stage II n=85	Non-persistent n=113	Stage I progressing n=56	Persistent stage I n=294	Persistent stage II n=61
FEV1 (L)	3.66	3.42	2.96	3.27	2.92	3.30	2.22
FEV1 follow-up (L)	3.31	2.91	2.14	3.11	2.00	2.87	1.79
FVC (L)	4.49	4.54	3.92	4.84	4.61	4.97	3.87
FVC follow-up (L)	4.25	4.34	3.41	4.23	3.73	4.49	3.28

¹Obstruction was defined as FEV1/FVC<0.70 based on pre-bronchodilation spirometry.

Online table O4 Rate of non-persistence¹ of spirometric obstruction during 11 years of follow-up according to a set of baseline predictors

Predictor at baseline	Person-years at risk (in 1000)	Number of cases	Non-persistence rate (cases/1000 person-years) (95% CI)	Crude non-persistence rate ratio (95% CI)	Adjusted ⁴ non-persistence rate ratio (95% CI)
All (N=540)²	5.89	113	19.20 (15.97 - 23.09)		
Gender:					
· men	3.62	67	18.49 (14.55 - 23.49)	1.00 (Ref)	1.00 (Ref)
· women	2.26	46	20.35 (15.24 - 27.17)	1.10 (0.79 - 1.54)	1.08 (0.74 - 1.57)
Age (years) at baseline					
· 18-30	0.34	6	17.66 (7.94 - 39.32)	1.00 (Ref)	1.00 (Ref)
· >30-40	0.77	17	21.96 (13.65 - 35.32)	1.24 (0.54 - 2.86)	1.17 (0.48 - 2.82)
· >40-50	1.94	46	23.73 (17.78 - 31.69)	1.34 (0.64 - 2.84)	1.28 (0.57 - 2.89)
· >50	2.83	44	15.53 (11.56 - 20.87)	0.88 (0.40 - 1.93)	0.92 (0.40 - 2.10)
Smoking status at baseline³:					
· never smoker	2.36	50	21.15 (16.03 - 27.91)	1.00 (Ref)	
· ever smoker:					1.00 (Ref)
<15 packyrs.	1.16	30	25.79 (18.03 - 36.88)	1.22 (0.82 - 1.81)	0.98 (0.64 - 1.52)
≥15 packyrs	2.36	33	13.99 (9.95 - 19.69)	0.66 (0.44 - 0.99)	0.66 (0.43 - 1.03)
Chronic bronchitis at baseline:					
· absent	5.00	102	20.42 (16.81 - 24.79)	1.00 (Ref)	1.00 (Ref)
· present	0.89	11	12.37 (6.85 - 22.35)	0.61 (0.35 - 1.06)	0.87 (0.47 - 1.59)
Asthma at baseline					
· absent	4.98	102	20.48 (16.87 - 24.87)	1.00 (Ref)	1.00 (Ref)
· present, but non-current	0.44	6	13.69 (6.15 - 30.48)	0.67 (0.32 - 1.40)	0.89 (0.36 - 2.19)
· present, current	0.47	5	10.70 (4.45 - 25.70)	0.52 (0.23 - 1.17)	1.20 (0.37 - 3.90)

Asthma at Follow-up

· absent	4.81	100	20.81	(17.11 - 25.32)	1.00 (Ref)	1.00 (Ref)
· present, but non-current	0.47	10	21.23	(11.42 - 39.46)	1.02 (0.57 - 1.82)	1.15 (0.53 - 2.48)
· present, current	0.61	3	4.93	(1.59 - 15.28)	0.24 (0.08 - 0.67)	0.26 (0.07 - 0.90)

Wheezing without cold at baseline

· absent	5.10	104	20.40	(16.83 - 24.73)	1.00 (Ref)	1.00 (Ref)
· present	0.77	9	11.75	(6.11 - 22.58)	0.58 (0.31 - 1.06)	0.92 (0.45 - 1.88)

Wheezing without cold at follow-up

· absent	4.87	103	21.16	(17.45 - 25.67)	1.00 (Ref)	1.00 (Ref)
· present	1.02	10	9.82	(5.28 - 18.25)	0.46 (0.26 - 0.83)	0.69 (0.36 - 1.32)

¹ Non-persistence of obstruction was defined as FEV1/FVC <0.70 at baseline and ≥0.70 at follow-up based on pre-bronchodilation spirometry

² additional reduction of sample size due to exclusion of participants with >120 pack years at baseline or > 150 at follow-up

³ smoking status at baseline: never smokers: <20 packs of cigarettes and <360 g of tobacco in /lifetime

⁴ adjusted for study area, educational level, and all predictors listed in the table

Table O5 Incidence and non-persistence rates of obstruction as defined by the FEV1/FVC lower limit of normal threshold during 11 years of follow-up according to a set of predictors measured at baseline

Predictor	Incidence of Spirometric Obstruction (N=5089) ¹				Non-persistence of Spirometric Obstruction (N=396) ¹					
	Number of cases	Incidence rate (cases/1000 person-years) (95% CI)	Adjusted incidence rate ratio ³ (95% CI)		Number of cases	Non-persistence rate (cases/1000 person-years) (95% CI)	Adjusted non-persistence rate ratio ³ (95% CI)			
All	398	7.16	(6.49-7.90)		136	31.49	(26.62-37.25)			
Gender:										
· men	156	6.02	(5.14-7.04)		61	27.06	(21.05-34.78)		1.00	(Ref)
· women	242	8.16	(7.20-9.26)		75	36.33	(28.97-45.56)		1.28	(0.95-1.72)
Age (years) at baseline										
· 18-30	60	5.27	(4.09-6.79)		16	27.63	(16.93-45.10)		1.00	(Ref)
· >30-40	107	7.34	(6.08-8.88)		31	34.23	(24.07-48.67)		1.10	(0.66-1.83)
· >40-50	116	7.10	(5.92-8.52)		51	36.01	(27.37-47.39)		1.12	(0.70-1.81)
· >50	115	8.66	(7.21-10.40)		38	26.80	(19.50-36.83)		0.87	(0.52-1.46)
Smoking status at baseline²:										
· never smoker	173	6.06	(5.22-7.03)		61	33.51	(26.08-43.07)			
· ever smoker:									1.00	(Ref)
<15 packyrs.	79	5.23	(4.20-6.52)		39	38.90	(28.42-53.25)		1.09	(0.78-1.54)
≥15 packyrs	146	12.28	(10.44-14.44)		36	24.06	(17.36-33.36)		0.67	(0.46-0.97)

Chronic bronchitis at baseline:

·	absent	335	6.57	(5.90-7.31)	1.00	(Ref)	119	32.92	(27.50-39.39)	1.00	(Ref)
·	present	63	13.79	(10.78-17.66)	1.66	(1.26-2.18)	17	24.17	(15.02-38.88)	1.14	(0.73-1.80)

Asthma at baseline

·	absent	354	6.81	(6.13-7.56)	1.00	(Ref)	118	34.13	(28.50-40.88)	1.00	(Ref)
·	non-current	25	10.51	(7.10-15.55)	1.37	(0.86-2.18)	9	22.81	(11.87-43.84)	1.28	(0.66-2.49)
·	current	19	16.13	(10.29-25.28)	0.68	(0.36-1.29)	9	19.26	(10.02-37.03)	1.23	(0.52-2.92)

Asthma at Follow-up

·	absent	343	6.69	(6.02-7.44)	1.00	(Ref)	118	35.83	(29.91-42.91)	1.00	(Ref)
·	non-current	21	7.82	(5.10-11.99)	0.98	(0.60-1.60)	11	25.67	(14.21-46.35)	0.63	(0.32-1.22)
·	current	34	21.10	(15.08-29.54)	2.07	(1.17-3.67)	7	11.73	(5.59-24.60)	0.47	(0.20-1.08)

Wheezing without cold at baseline

·	absent	352	6.73	(6.06-7.47)	1.00	(Ref)	122	34.12	(28.57-40.75)	1.00	(Ref)
·	present	43	14.26	(10.58-19.23)	1.15	(0.81-1.62)	14	19.69	(11.66-33.25)	0.76	(0.45-1.28)

Wheezing without cold at follow-up

·	absent	331	6.39	(5.74-7.12)	1.00	(Ref)	119	34.90	(29.16-41.77)	1.00	(Ref)
·	present	67	17.80	(14.01-22.62)	1.92	(1.42-2.58)	17	18.71	(11.63-30.09)	0.71	(0.45-1.11)

¹ additional reduction of sample size due to exclusion of participants with >120 pack years at baseline or > 150 at follow-up

² smoking status at baseline: never smokers: <20 packs of cigarettes and <360 g of tobacco in /lifetime

³ adjusted for study area, educational level, and all predictors listed in the table

Online Table O6 Association¹ of categories of change in severity of obstruction² with health service use for respiratory problems at follow-up

Variable	Crude Model		Adjusting for all but asthma covariates ³		Adjusting for asthma & wheezing at base-line or follow-up	
	Rel. rate (95%-CI)	p-value	Rel.rate (95%-CI)	p-value	Rel.rate (95%-CI)	p-value
Incident stage I (n= 683)	1.40 (0.98 - 1.99)	0.063	1.46 (0.99 - 2.15)	0.054	1.00 (0.66 - 1.54)	0.982
Incident stage II (n= 85)	4.57 (2.52 - 8.29)	0.000	3.97 (2.10 - 7.54)	0.000	1.75 (0.82 - 3.75)	0.149
Persistent stage I (n=294)	1.20 (0.70 - 2.06)	0.508	1.33 (0.73 - 2.41)	0.349	0.82 (0.41 - 1.61)	0.558
Stage I progressing (n= 56)	5.01 (2.48 - 10.12)	0.000	5.21 (2.38 - 11.40)	0.000	2.49 (1.02 - 6.10)	0.046
Persistence stage II (n= 61)	10.47 (5.85 - 18.76)	0.000	10.07 (5.17 - 19.62)	0.000	4.17 (1.91 - 9.13)	0.000
Non-persistent obstruction (n= 113)	1.49 (0.68 - 3.26)	0.315	2.26 (1.00 - 5.13)	0.050	2.28 (0.98 - 5.27)	0.054
Asthma at baseline						
non-current⁴					0.47 (0.23 - 0.94)	0.032
current⁴					2.10 (1.01 - 4.37)	0.048
Asthma at follow-up						
non-current⁴					1.56 (0.86 - 2.81)	0.141
current⁴					6.81	0.000

	(3.65 - 12.70)	
Wheezing without a cold at baseline	1.32	0.216
	(0.85 - 2.07)	
Wheezing without a cold at follow-up	2.55	0.000
	(1.75 - 3.71)	

95%-CI: 95%-confidence intervals; PY: pack-years

¹ Reference category: persistently without obstruction to the airflow

² Obstruction was defined as FEV1/FVC<0.70 based on pre-bronchodilation spirometry.

³ Covariates adjusted for were: sex, age, smoking (light or heavy ever smoker), chronic bronchitis, shortness of breath while walking at baseline, health service use for respiratory problems at baseline, education and area.

⁴ Current asthma was defined as presence of asthma attacks in the 12 months prior to assessment or current asthma medication.

Non-current asthma cases were defined as self-declared asthma without attacks or asthma medication.