

Supplementary Online Content

Cepelis A, Brumpton BM, Malmo V, et al. Associations of asthma and asthma control with atrial fibrillation risk: results from the Nord-Trøndelag health study (HUNT). *JAMA Cardiol*. Published online July 11, 2018. doi: 10.1001/jamacardio.2018.1901

eTable 1. Asthma assessment questions in HUNT2 and HUNT3

eTable 2. The GINA assessment of asthma control and corresponding questions in HUNT2 and HUNT3

eTable 3. Definitions of levels of asthma control in the current study

eTable 4. Sensitivity analysis of associations between asthma, asthma control and the risk of AF

This supplementary material has been provided by the authors to give readers additional information about their work.

Supplementary Tables

eTable 1. Asthma assessment questions in HUNT2 and HUNT3

Asthma Category	HUNT2 Question	HUNT3 Question
Ever Asthma (n = 5 564)	Have you ever had asthma?	Have you ever had asthma?
Diagnosed Asthma (n = 3 812)	Have you been diagnosed as having asthma by doctor?	Has a doctor diagnosed you as having asthma?
Active Asthma (n = 2 472)	In the past 12 months, have you used asthma medication?	Have you at any time during the last 5 years taken medicine for asthma, chronic bronchitis, emphysema or COPD?

eTable 2. The GINA assessment of asthma control and corresponding questions in HUNT2 and HUNT3

GINA asthma control symptoms	HUNT2 Symptoms	HUNT3 Symptoms
1) Daytime symptoms		
In the past 4 weeks, has the patient had: Daytime asthma symptoms more than twice/week?	Have you at any time in the last 12 months been short of breath when resting during the day? (Yes/No)	Think about the past 7 days: How many days have you had symptoms of your lung disease?
Controlled = ≤ 2 times/week	Controlled = No	Controlled = ≤ 2 times/week
2) Night awakenings		
In the past 4 weeks, has the patient had: Any night waking due to asthma?	Have you woken up with a feeling of tightness in your chest at any time in the last 12 months? (Yes/No)	How many of the last 7 nights have you been affected/woken by your breathing problems (including coughing)?
Controlled = 0 times/4 weeks	Controlled = No	0 times/week
3) Reliever medication need		
In the past 4 weeks, has the patient had: Reliever for asthma needed* more than twice/week?	If you currently use asthma medicines, have you used short-acting beta2 agonists in the last month? (Never, once or less often a week, many times a week, daily)	How many days in the past week have you taken symptom relieving medicine?
Controlled = ≤ 2 times/week*	Controlled = \leq once or less often a week	Controlled = ≤ 2 times/week
4) Activity limitations		
In the past 4 weeks, has the patient had: Any activity limitation due to asthma?	How much do your respiratory problems (dyspnea) affect your daily activities? (Not at all, a little, much, very much)	How many of the last 7 days have breathing problems interfered with your normal activities (sports, school, work, housework, etc.)?
Controlled = 0 times/4 weeks	Controlled = \leq a little	Controlled = 0 times/week

* Excluded reliever medication taken before exercise

eTable 3. Definitions of levels of asthma control in the current study

	Levels of Asthma Control		
Characteristics (past week)	Controlled All of the following	Partly controlled <3 features	Uncontrolled >2 features of partly controlled asthma
1) Daytime symptoms	≤2 times/week	>2 times/week	
2) Nocturnal symptoms/ awakening	None	Any	
3) Need for reliever/ rescue treatment	≤2 times/week	>2 times/week	
4) Limitation of activities	None	Any	

Adopted from Global Initiative for Asthma (GINA) Global Strategy for Asthma Management and Prevention (22).

eTable 4. Sensitivity analysis of associations between asthma, asthma control and the risk of AF

	Sensitivity 1 (n = 54 296) ¹		Sensitivity 2 (n = 46 551) ²		Sensitivity 3 (n = 53 418) ³	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Asthma						
Ever asthma	1.22 (1.06 – 1.41)	1.21 (1.05 – 1.40)	1.25 (1.05 – 1.49)	1.24 (1.04 – 1.48)	1.26 (1.07 – 1.48)	1.25 (1.06 – 1.47)
Diagnosed asthma	1.36 (1.15 – 1.60)	1.33 (1.13 – 1.57)	1.39 (1.41 – 1.70)	1.37 (1.12 – 1.67)	1.34 (1.10 – 1.64)	1.33 (1.09 – 1.62)
Active asthma	1.73 (1.43 – 2.09)	1.69 (1.40 – 2.04)	1.73 (1.36 – 2.20)	1.68 (1.32 – 2.13)	1.71 (1.34 – 2.18)	1.69 (1.33 – 2.15)
Asthma control						
Controlled asthma	1.18 (0.96 – 1.45)	1.16 (0.94 – 1.43)	1.19 (0.98 – 1.45)	1.17 (0.96 – 1.42)	1.13 (0.89 – 1.43)	1.12 (0.88 – 1.42)
Partly controlled asthma	1.33 (1.07 – 1.64)	1.31 (1.06 – 1.63)	1.41 (1.15 – 1.72)	1.39 (1.14 – 1.70)	1.48 (1.15 – 1.90)	1.48 (1.15 – 1.90)
Uncontrolled asthma	1.51 (1.05 – 2.16)	1.51 (1.05 – 2.17)	1.72 (1.24 – 2.39)	1.73 (1.24 – 2.39)	1.73 (1.14 – 2.63)	1.75 (1.15 – 2.67)

Hazard ratios and 95% confidence intervals were derived from Cox proportional hazards models

Model 1 adjusted for age and sex

Model 2 adjusted for Model 1 + BMI, smoking status, alcohol use, physical activity, education level, W/H ratio and diabetes mellitus

¹ Excluding first five years of follow-up (n = 320)

² Excluding participants who had self-reported comorbidities. diagnosed AMI (n = 3759) or HF (n = 1218) during follow-up (total n = 8016)

³ Excluding participants who were diagnosed with asthma at the age of 40 or older (n = 1128)