**Supplementary table 1.** Characteristics of the analysis cohort participants, Nord-Trøndelag Health Study, Norway (n=23 191).

| Baseline characteristics | Women (n=12 760) | | Men (n=10 431) | |
|---|---|---|---|---|
| | **n** | **%** | **n** | **%** |
| **Age (years)** | | | | |
| 19-29 | 2 111 | 16.5 | 1 543 | 14.8 |
| 30-39 | 3 910 | 30.6 | 3 032 | 29.1 |
| 40-49 | 4 930 | 38.6 | 4 247 | 40.7 |
| 50-55 | 1 809 | 14.2 | 1 609 | 15.4 |
| **Family history of asthma** [a] | 2 137 | 18.2 | 1 240 | 12.8 |
| **Smoking** [a] | 4 055 | 33.6 | 2 628 | 26.4 |
| **Physical activity (hours/week)** [a] | | | | |
| <1 | 2 583 | 22.2 | 2 669 | 29.2 |
| 1-2 | 4 990 | 42.8 | 3 369 | 36.8 |
| ≥3 | 4 079 | 35.0 | 3 115 | 34.0 |
| **Education (years)** [a] | | | | |
| ≤10 | 2 716 | 21.5 | 1 943 | 18.8 |
| 11-12 | 6 419 | 51.3 | 5 796 | 56.0 |
| ≥13 | 3 444 | 27.2 | 2 603 | 25.2 |
| **Social benefit recipient** [a] | 2 890 | 27.3 | 1 073 | 13.1 |
| **Economic difficulties** [a] | 3 688 | 33.1 | 2 686 | 31.0 |
| **Allergic rhinitis** [a] | 2 693 | 26.0 | 1 674 | 21.1 |
| **Gastroesophageal reflux disease** [a] | 3 937 | 39.0 | 3 593 | 45.9 |
| **Waist circumference** | | | | |
| ≥88 cm in women, ≥102 cm in men | 2 239 | 17.6 | 924 | 8.9 |
| **Triglycerides (mmol/L)** | | | | |
| ≥1.7mmol/L | 2 651 | 20.8 | 4 922 | 47.2 |
| **HDL cholesterol** | | | | |
| <1.3 mmol/L in women, <1.0 mmol/L in men | 3 109 | 24.4 | 1 819 | 17.4 |
| **Elevated blood pressure or use of anti-hypertensive medication** | | | | |
| Systolic blood pressure ≥130 mm Hg or diastolic blood pressure ≥85 mm Hg or use of anti-hypertensive medication | 4 652 | 36.5 | 6 757 | 64.8 |
| **Elevated glucose or diabetes** | | | | |
| ≥5.6 mmol/L and ≥4 hours since last meal or diabetes | 253 | 2.0 | 346 | 3.3 |

HDL: high-density lipoprotein.

[a] Number of observations does not include total cohort because of missing.

**Supplementary table 2.** Association (odds ratios) of metabolic syndrome and its components with incident asthma in women (n=12 760).

| Metabolic components | Total | Incident asthma | Model 1(adjusted age and family history of asthma) | Model 2 (adjusted all covariates) | Model 3 (adjusted all covariates and other metabolic components) |
|---|---|---|---|---|---|
| | | | | *OR (95% CI)* | |
| **Waist circumference** ≥88 cm | 2 239 | 158 | 1.94 (1.60 to 2.35) | 1.81 (1.49 to 2.20) | 1.59 (1.28 to 1.97) |
| **Triglycerides** ≥1.7 mmol/L | 2 651 | 164 | 1.61 (1.33 to 1.94) | 1.45 (1.19 to 1.75) | 1.15 (0.93 to 1.43) |
| **HDL cholesterol** <1.3 mmol/L | 3 109 | 188 | 1.59 (1.32 to 1.90) | 1.41 (1.17 to 1.70) | 1.21 (0.99 to 1.48) |
| **Elevated blood pressure [a] or use of anti-hypertensive medication** | 4 652 | 221 | 1.20 (1.01 to 1.44) | 1.21(1.01 to 1.45) | 1.07 (0.89 to 1.30) |
| **Elevated glucose [b] or diabetes** | 253 | 20 | 1.89 (1.18 to 3.02) | 1.85 (1.15 to 2.96) | 1.63 (1.01 to 2.62) |
| **Metabolic syndrome [c]** ≥3 components | 1 434 | 105 | 1.88 (1.51 to 2.36) | 1.69 (1.35 to 2.13) | n/a |

CI: confidence interval, HDL: high-density lipoprotein, n/a: not applicable, OR: odds ratio.

Model 1 adjusted for age and family history of asthma; Model 2 adjusted for age, family history of asthma, smoking, physical activity, education, social benefit and economic difficulties at baseline; Model 3 adjusted for all covariates and other metabolic risk factors.

[a] Systolic blood pressure ≥130 mm Hg or diastolic blood pressure ≥85 mm Hg.

[b] Elevated glucose was ≥5.6 mmol/L and ≥4 hours since last meal.

[c] Metabolic syndrome was defined according to the Joint Interim Statement clinical criteria including alternate indicators anti-hypertensive medication and diabetes. Glucose was non-fasting and ≥4 hours since last meal.

**Supplementary table 3.** Association (odds ratios) of metabolic syndrome and its components with incident asthma in men (n=10 431).

| Metabolic components | Total | Incident asthma | Model 1 (adjusted age and family history of asthma) | Model 2 (adjusted all covariates) | Model 3 (adjusted all covariates and other metabolic components) |
|---|---|---|---|---|---|
| | | | | *OR (95% CI)* | |
| **Waist circumference** ≥102 cm | 924 | 47 | 1.65 (1.20 to 2.28) | 1.55 (1.12 to 2.14) | 1.56 (1.12 to 2.17) |
| **Triglycerides** ≥1.7 mmol/L | 4 922 | 160 | 1.01 (0.81 to 1.26) | 1.00 (0.80 to 1.24) | 0.96 (0.76 to 1.21) |
| **HDL cholesterol** <1.0 mmol/L | 1 819 | 59 | 1.01 (0.76 to 1.34) | 0.99 (0.74 to 1.33) | 0.97 (0.72 to 1.32) |
| **Elevated blood pressure [a] or use of anti-hypertensive medication** | 6 757 | 219 | 1.02 (0.81 to 1.28) | 1.02 (0.81 to 1.29) | 1.00 (0.79 to 1.26) |
| **Elevated glucose [b] or diabetes** | 346 | 15 | 1.37 (0.81 to 2.34) | 1.28 (0.75 to 2.18) | 1.23 (0.72 to 2.10) |
| **Metabolic syndrome [c]** ≥3 components | 1 537 | 67 | 1.45 (1.10 to 1.91) | 1.41 (1.07 to 1.87) | n/a |

CI: confidence interval, HDL: high-density lipoprotein, n/a: not applicable, OR: odds ratio.

Model 1 adjusted for age and family history of asthma; Model 2 adjusted for age, family history of asthma, smoking, physical activity, education, social benefit and economic difficulties at baseline; Model 3 adjusted for all covariates and other metabolic risk factors.

[a] Systolic blood pressure ≥130 mm Hg or diastolic blood pressure ≥85 mm Hg.

[b] Elevated glucose was ≥5.6 mmol/L and ≥4 hours since last meal.

[c] Metabolic syndrome was defined according to the Joint Interim Statement clinical criteria including alternate indicators anti-hypertensive medication and diabetes. Glucose was non-fasting and ≥4 hours since last meal.


**Supplementary table 4.** Subgroup analysis according to allergic rhinitis: Association (odds ratios) of metabolic syndrome with incident asthma stratified by allergic rhinitis.

| | Total | Incident asthma | Unstratified (n=23 191) | Stratified by allergic rhinitis |
|---|---|---|---|---|

|  |  |  | Yes (n=13 921) | No (n=4 367) | Missing (n=4 903) |
|---|---|---|---|---|---|
|  |  |  | *Adjusted OR (95% CI)[a]* | | |
| **Metabolic syndrome** [b] ≥3 components | 2 971 | 172 | 1.57(1.31 to 1.87) | 1.44 (1.08 to 1.94) | 1.67 (1.27 to 2.19) | 1.51 (0.99 to 2.29) |

CI: confidence interval, OR: odds ratio.

[a] Adjusted for age, sex, family history of asthma, smoking, physical activity, education, social benefit and economic difficulties at baseline.

[b] Metabolic syndrome was defined according to the Joint Interim Statement clinical criteria including alternate indicators anti-hypertensive medication and diabetes. Glucose was non-fasting and ≥4 hours since last meal.