

## Additional File 7

### Additional Information

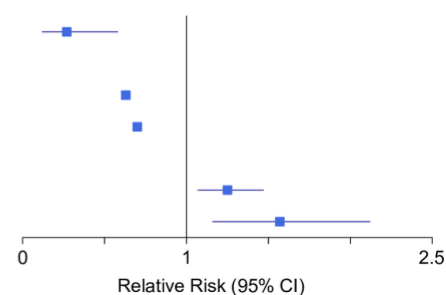
The Additional file 7 contains additional information for:

Guo-Qiang Zhang\*, Rani Basna, Maya B. Mathur, Cecilia Lässer, Roxana Mincheva, Linda Ekerljung, Göran Wennergren, Madeleine Råding, Bo Lundbäck, Hannu Kankaanranta, Bright I. Nwaru. Exogenous female sex steroid hormones and new-onset asthma in women: a matched case-control study. 2023.

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Study	Age at Baseline	No. of Population	Type of Estimate	Relative Risk (95% CI)
<b>Wei et al 2015<sup>1</sup></b>				
Ever use	9-11 years	1,191	OR	0.27 (0.12, 0.58)
<b>Nwaru et al 2020<sup>2</sup></b>				
Current use	16-45 years	564,896	HR	0.63 (0.61, 0.65)
Past use	16-45 years	564,896	HR	0.70 (0.68, 0.72)
<b>Troisi et al 1995<sup>3,a</sup></b>				
All women	34-68 years	64,237	HR	1.25 (1.07, 1.47)
Menopausal women	NA	NA	HR	1.57 (1.16, 2.12)



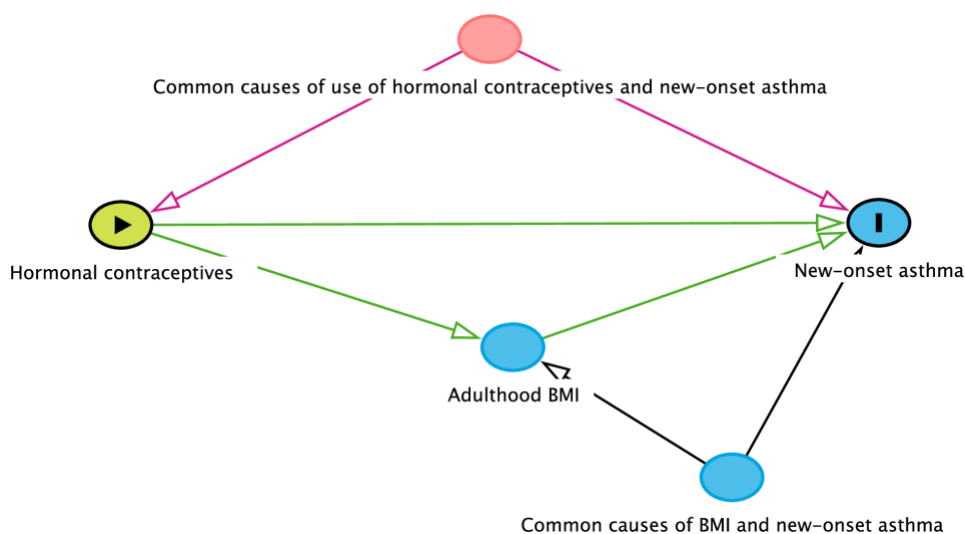
### Figure S1. Previous cohort studies on use of hormonal contraceptives and new-onset asthma in women.

In a German prospective community-based cohort study<sup>1</sup> of 1,191 girls aged 9–11 years followed into early adulthood (19–24 years old), ever use of hormonal contraceptives was associated with decreased odds of new-onset asthma (odds ratio [OR] 0.27, 95% confidence interval [CI] 0.12–0.58); in a national UK cohort study<sup>2</sup> of 564,896 women aged 16–45 years, past or current use of hormonal contraceptives was associated with a decreased risk of new-onset asthma, with hazard ratios (HRs) ranging from 0.59 to 0.70 for different types of hormonal contraceptives; the Nurses' Health Study<sup>3</sup> including 64,237 women aged 34–68 years found that past use of hormonal contraceptives was associated with an increased risk of new-onset asthma (HR 1.25, 95% CI 1.07–1.47), and the effect estimate became even larger among naturally menopausal women (HR 1.57, 95% CI 1.16–2.12).

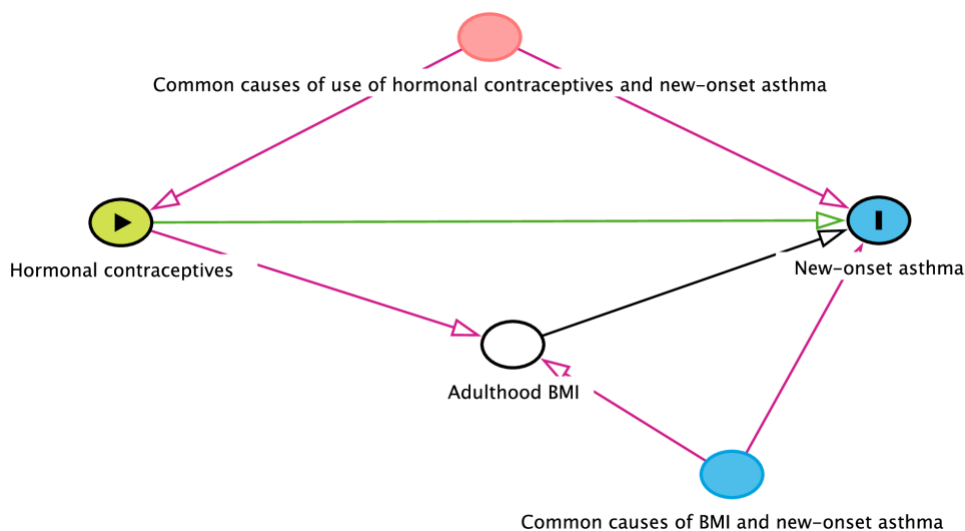
Abbreviations: CI, confidence interval; HR, hazard ratio; NA, not available; OR, odds ratio.








<sup>a</sup> Past use of hormonal contraceptives.

A



B



-  exposure
-  outcome
-  ancestor of exposure and outcome
-  ancestor of outcome
-  adjusted variable
-  causal path
-  biasing path

**Figure S2. Simplified causal directed acyclic graphs to represent the role of body mass index for the effect of use of hormonal contraceptives on new-onset asthma in women.**

A. When one is interested in the overall causal effect of use of hormonal contraceptives on new-onset asthma, adjustment for body mass index (BMI) is unwarranted. B. When one is interested in the modifying effect of BMI, stratification by BMI is justified, but would introduce a spurious association between hormonal contraceptives and new-onset asthma, in the presence of common causes of BMI and new-onset asthma (e.g., physical activity, alcohol, stress, diet). Abbreviations: BMI, body mass index. The directed acyclic graphs were drawn using DAGitty (<http://dagitty.net>).

**eReferences**

1. Wei J, Gerlich J, Genuneit J, Nowak D, Vogelberg C, von Mutius E, et al. Hormonal factors and incident asthma and allergic rhinitis during puberty in girls. *Ann Allergy Asthma Immunol*. 2015;115(1):21-7.
2. Nwaru BI, Pillinger R, Tibble H, Shah SA, Ryan D, Critchley H, et al. Hormonal contraceptives and onset of asthma in reproductive-age women: population-based cohort study. *J Allergy Clin Immunol*. 2020;146(2):438-46.
3. Troisi RJ, Speizer FE, Willett WC, Trichopoulos D, Rosner B. Menopause, postmenopausal estrogen preparations, and the risk of adult-onset asthma. A prospective cohort study. *Am J Respir Crit Care Med*. 1995;152(4 Pt 1):1183-8.