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**Title:** Age of menarche and risk of asthma: Systematic review and meta-analysis

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**Body:** Aim: To conduct a systematic review and meta-analysis of the relationship between the age at menarche and risk of asthma. Methods: A prespecified literature search strategy was used to identify all articles directly concerning the relationship between asthma and age at menarche. We were interested in studies with asthma defined as self reported asthma, diagnosed asthma or asthma symptoms and in studies defining early menarche as menarche before the age of 12 years of age or younger. Further, we were interested in controlled trials, prospective and retrospective cohort studies, case-control-studies and cross-sectional studies with or without modelling. Results: Our searches identified 34 articles of which 8 matched the inclusion criteria (two cross-sectional studies, three case-control studies, two retrospective studies, and one prospective study) with a total of 18124 patients. All articles were consistent in their results, showing a clear positive relationship between asthma and age at menarche. Estimates from the selected studies showed that the risk of asthma was increased between 1.13 and 2.34 times in girls with early menarche. Conclusions: Early age at menarche is associated with increased risk of asthma. Hormonal, immunological, genetic, and environmental factors may act in a developmental context to explain this relationship.