



**Definitions of Asthma for  
UK Biobank Phase 1 Outcomes Adjudication**

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## **Definitions of Asthma, UK Biobank Phase 1 Outcomes Adjudication**

Data sources on which the algorithm relies are: UKB baseline assessment data (verbal interview); linked hospital admissions data (HES APC, SMR01, PEDW); and death register data.

### **Definitions & Abbreviations:**

<b>HES APC</b>	<b>Hospital Episode Statistics - Admitted Patient Care (England)</b>
<b>SMR01</b>	<b>Scottish Morbidity Records – General / Acute Inpatient and Day Case Admissions (Scotland)</b>
<b>PEDW</b>	<b>Patient Episode Database for Wales</b>
<b>EHR</b>	<b>Electronic Health Records</b>
<b>Finished Consultant Episode</b>	<b>The basic counting unit for statistics of admitted care Hospital EHR data (= a row of data in the data extracts provided) is a finished consultant episode (FCE).</b>
<b>Code date</b>	<b>The start date of the FCE is taken as the code date.</b>
<b>ICD 9</b>	<b>International Classification of Diseases, Version 9 (SMR only)</b>
<b>ICD 10</b>	<b>International Classification of Diseases, Version 10</b>
<b>Prevalent Case</b>	<b>First known hospitalisation with a relevant diagnostic code prior to recruitment, or self-reported event at recruitment.</b>
<b>Incident Case</b>	<b>First known hospitalisation with a relevant diagnostic code after recruitment, or cause-specific death, in those without indication of prevalent event as defined above.</b>

## **Background:**

Asthma is a chronic inflammatory respiratory condition, characterized by recurrent attacks of breathlessness and wheezing<sup>1</sup>. It affects all age groups, although often starts in childhood. Exacerbations of asthma (asthma attacks) may occur randomly or after exposure to a trigger, such as allergies, smoke, exercise or infections.

In the UK, around 5.4 million people are currently receiving treatment for asthma<sup>2</sup>. On average 185 people per day are admitted to hospital with asthma and around 1000-1200 people die from asthma in the UK every year<sup>3</sup>. It is estimated that each year the NHS spends around 1 billion pounds caring for people with this condition<sup>2</sup>.

A full list of the ICD and Biobank self-report codes used for asthma can be found in Table 1 at the end of this document.

The use of self-report code dates is discussed in Appendix 1.

## **A. ASTHMA**

### **(1) Asthma prior to baseline assessment ('prevalent Asthma')**

**(a) Asthma detected by hospital admission EHR (with or without self-report):** One (or more) of the ICD (9 or 10) codes listed in Table 1, in HES APC, SMR01 or PEDW linked records in the primary or any secondary position where either

- The first ICD code date is prior to the date of baseline assessment.

**OR**

- The participant has self-reported the condition at the baseline assessment, but the first ICD code date is post the date of baseline assessment.

**(b) Asthma by self-report only:** The participant has self-reported Asthma at baseline assessment, but without evidence of Asthma from linked HES APC, SMR01 or PEDW data (as defined above).

#### **Setting the date of prevalent Asthma diagnosis:**

- If a participant has both an ICD code and a self-report code, the earliest recorded date regardless of source is used.
- If a participant has both an ICD code and a self-report code, but the self-reported date is missing, the ICD code date is used unless it is post the date of baseline assessment, in which case the default missing date is used.
- If the participant has ICD code(s) only, the earliest ICD code date is used.
- If the participant has self-report code(s) only, the earliest self-reported date is used.
- Missing dates are set to 1/1/1900.

### **(2) Asthma following baseline assessment ('incident Asthma')**

#### **Excluding those with Asthma detected prior to baseline assessment:**

**(a) Asthma detected by hospital admission EHR:** One (or more) of the ICD (9 or 10) codes in HES APC, SMR01 or PEDW linked records, in the primary or any secondary position, with code date post the date of baseline assessment.

**(b) Asthma detected by death register only:** No ICD codes in HES APC, SMR01 or PEDW linked records, but one (or more) ICD codes in death register records, in the underlying cause or any other position.

#### **Setting the date of incident Asthma diagnosis:**

- If a participant has ICD codes in both hospital admission and death register records, the earliest recorded code date regardless of source is used.
- If ICD code(s) recorded in hospital admission only, the earliest ICD code date is used.
- If ICD code(s) recorded in death register only, the date of death is used.

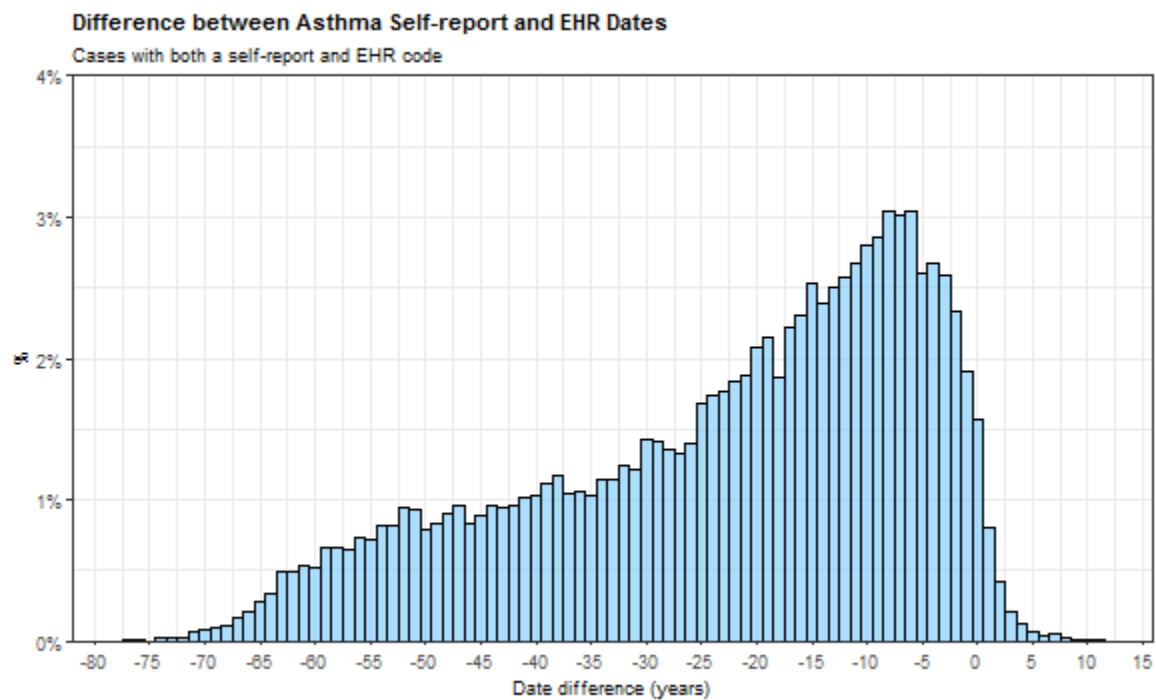
**Table 1. Code Lists for Asthma**

<b>UK Biobank Self Report Codes</b>			
<b>Code Type</b>	<b>Code</b>	<b>Biobank Code Text</b>	<b>Asthma</b>
UK Biobank Self Report	Field 20002 Code 1111	Asthma	ü
<b>ICD 9 Codes</b>			
<b>Code Type</b>	<b>ICD 9 Code</b>	<b>ICD 9 Text</b>	<b>Asthma</b>
ICD 9 Code	493	Asthma	ü
ICD 9 Code	493.0	Extrinsic asthma	ü
ICD 9 Code	493.1	Intrinsic asthma	ü
ICD 9 Code	493.2	Chronic obstructive asthma	ü
ICD 9 Code	493.8	Other forms of asthma	ü
ICD 9 Code	493.9	Asthma, unspecified	ü
<b>ICD 10 Codes</b>			
<b>Code Type</b>	<b>ICD 10 Code</b>	<b>ICD 10 Text</b>	<b>Asthma</b>
ICD 10 Code	J45	Asthma	ü
ICD 10 Code	J45.0	Predominantly allergic asthma	ü
ICD 10 Code	J45.1	Nonallergic asthma	ü
ICD 10 Code	J45.8	Mixed asthma	ü
ICD 10 Code	J45.9	Asthma, unspecified	ü
ICD 10 Code	J46.X	Status asthmaticus	ü

## Appendix 1

The self-report date is taken from the UK Biobank field [20008](#) ("Interpolated Year when non-cancer illness first diagnosed"). At the nurse led interviews, nurses were instructed to record either a year or an age at which the diagnosis occurred. Where an age was provided, a best-fit fractional year was then calculated.

For cases that have both a self-report and EHR code, this algorithm assigns the earliest of the two code dates as the event date for the case. The histogram below shows the difference (in years) between self-report and EHR dates for the subset of Asthma cases that have both. Negative values indicate that the self-report date is earlier than the EHR. In the vast majority of cases (98%), the earliest date is the self-reported date.



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## **References:**

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2. Asthma UK. 2018. *Asthma facts and statistics*. [ONLINE]. <http://www.asthma.org.uk/advice/understanding-asthma/what-is-asthma>. [Accessed 16 July 2018].
3. NICE Guidance. <http://www.nice.org.uk/guidance/qs25/chapter/introduction-and-overview>. [Accessed 16 July 2018].