**Statistical Analysis Plan (SAP)**

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| **Project reference:** | CCU052\_01 |
| **Project title:** | The changing epidemiology pre, during and post COVID-19 of asthma, interstitial lung disease (ILD) and chronic obstructive pulmonary disease (COPD) in England |
| **Proposal version:** | V1 |
| **Start date (best estimate):** | 01/03/2023 |
| **End date (best estimate)**[[1]](#footnote-1)**:** | 30/11/2023 |
| **Named project lead and institution/organisation:** | Professor Jennifer Quint, Imperial College London |

**Lay Summary**

We plan to describe the incidence of asthma, interstitial lung disease (ILD) and chronic obstructive pulmonary disease (COPD) in England from 2019 and understand how the COIVD-19 pandemic has changed these estimates. Given the impact of the COVID-19 pandemic we need to understand how these diseases are changing at a national level, to inform public health policy and planning.

We will collaborate with researchers to use English de-identified patient data to answer this question. These data sit in secure and safe research environments with several data sources linked together, including primary care, hospital data, death registry data, COVID-19 testing and vaccination data.

This research is of public benefit as we will answer important questions on how incidence of these common respiratory diseases has changed due to the pandemic and why. We will add value to these data, sharing expertise and data on lung disease. We will also develop an observatory, i.e. a large dataset of asthma, ILD and COPD patients which can potentially be maintained and regularly updated in the long term to answer further research within the TRE.

The findings from this project will provide insights into how common and severe these diseases are in different areas and populations. This knowledge will play a crucial role in public health planning and identifying areas for future research and development and help us to better understand the impact of the COVID-19 pandemic on respiratory diseases. We will add value to these data, sharing respiratory clinical and data expertise. Our work could be used to develop disease specific risk models’ clinicians, healthcare providers and policy makers and influencers can use to better understand these diseases at a population level.

**Authors:** JK Quint & H Whittaker

**Title**: The changing epidemiology pre, during and post COVID-19 of asthma, interstitial lung disease (ILD) and chronic obstructive pulmonary disease (COPD) in England.

**Background**

Asthma, interstitial lung disease (ILD) and Chronic Obstructive Pulmonary Disease (COPD) are

chronic respiratory diseases that cause substantial disability and deaths (Mukherjee et al., 2016;

GBD 2015 Chronic Respiratory Disease Collaborators, 2017; Forum of International Respiratory

Societies, 2017; Chief Medical Officer, 2004). Asthma is a chronic inflammatory respiratory disease, which affects individuals of all ages. Estimates of incidence of asthma within the UK indicate a high burden of disease ranging from 5.7% to 29.5% depending on how this is measured (Mukherjee, 2016; Bloom et al., 2019).

ILD encompasses a heterogeneous group of disorders, ranging from conditions which completely

resolve without requirement for pharmacological intervention through to fibrotic lung diseases

which inexorably progress to respiratory failure and death despite treatment. Hence ILD is often

used as an umbrella term to represent a diverse group of lung conditions with different

aetiologies, unpredictable progression and varying survival times. The most common ILD with

progressive fibrosis is IPF, which has attracted the most research interest in recent years. This is

likely because not only is it the most prevalent of the ILDs but also has a universally progressive

nature and a poor prognosis. There are no incidence and prevalence figures reported for ILD as a

group in the UK, however it has been estimated that in 2012 the prevalence and incidence rates

of IPF were 38.82 and 8.65 per 100,000 patients with increasing incidence since 2000

(Strongman, Kausar & Maher, 2018).

COPD is a chronic condition characterised by progressive airflow obstruction, which is not

completely reversible (Halpin et al., 2006; Devereux, 2006). In 2020/21, the prevalence of COPD

in England was 1.9%, which is roughly 1.17 million people (NHS Digital, 2021). COPD contributes

to nearly 30,000 deaths each year in the UK, corresponding to 5.7% of adult male and 4% of adult

female deaths, including a significant number of premature deaths (Chief Medical Officer, 2004).

We know that these diseases have a high burden in the UK, however the burdens are not

adequately quantified nor do we know how these burdens are evolving over time for different

demographics, including during the COVID-19 pandemic period. In addition to this, we do not

know how treatments, healthcare utilisation and outcomes for these diseases have changed. Given the impact of the COVID-19 pandemic we need to understand how these diseases are changing at a national level, to inform public health policy and planning. We aim to better understand the incidence of asthma, ILD, and COPD from 2019 to the last available data to determine whether this has changed due to the pandemic.

**Research Hypothesis**

This is a descriptive piece of work that will report estimates of asthma, ILD, and COPD incidence, prevalence, and exacerbations, and all-cause and cause-specific mortality from 2019 to the end of 2022.

**Data sources**

***NHS Digital TRE for England (up to latest release)***

* Primary care data (GP Data for Pandemic Planning and Research via General Practice Extraction Service, GPES)
* Second Generation Surveillance System (SGSS) COVID-19 infection laboratory testing data
* Pillar 2 Antigen
* Hospital episode statistics Admitted Patient Care (HES APC)
* SUS: Secondary Uses Service
* Vaccination Events
* Office for National Statistics (ONS) death registration records
* CHESS: COVID-19 Hospitalisation in England Surveillance System
* Medicined Dispensed in Primary Care (NHS BSA)
* Secondary Care Prescribed Medicines (EPMA)

**Research question**

Objective 1: How does the incidence and prevalence of asthma, ILD, and COPD change from 2019 to the end of 2022?

Objective 2: How do yearly mortality and exacerbation rates (all-cause and cause-specific) of people with asthma, ILD, and COPD change from 2019 to the end of 2022?

**Study population**

**Objective 1:**

To answer our first question, we will use a population of people who are registered with a general practice in England. Specifically, we will include those with:

* Known sex;
* A record in the primary care extract;
* A valid linkage identifier;
* Alive on 1st November 2019

Follow-up will be from the 1st November 2019 to most recent data available.

**Objective 2:**

To answer our second question, we will use a population of people with i) COPD, ii) asthma, and iii) ILD separately. For each cohort we will include those with:

* Known sex;
* A record in the primary care extract;
* A valid linkage identifier;
* Alive on 1st November 2019
* A primary care diagnosis of COPD, asthma, or ILD for each specific cohort
* Age ≥40 years old at date of COPD diagnosis for the COPD cohort and age ≥40 years at date of diagnosis for the ILD cohort. There will be no age criteria for the asthma cohort to include both adults and children with asthma.

Follow-up will be from the 1st November 2019 to most recent data available.

Chart, bubble chart

Description automatically generated

**Exposures**

There will be no exposures for this project as this is a descriptive piece of work however, for both objective 1 and 2, estimates will be stratified by population characteristics and social inequalities.

**Outcomes**

Objective 1: monthly incidence and prevalence of COPD, asthma, and ILD (See appendix. Code lists to be uploaded to GitHub).

Objective 2: All-cause & disease-specific mortality (respiratory related and cardiovascular disease related) and monthly exacerbations.

**Statistical methods**

The primary aim of the study is a descriptive analysis of cohorts of asthma, ILD and COPD

patients from 1st November 2019 to the end of 2022 or to the most recent data available in the TRE. We will describe monthly incidence rates, prevalence rates, mortality rates (all-cause and cause-specific), and exacerbation rates of each disease over the study period stratify by demographic and population characteristics (age, sex, region, IMD, ethnicity). Date of diagnosis will be ascertained where possible (from date of earliest mention of a relevant disease code).

Demographic characteristics will include age (at the 1st November 2019), sex, region, IMD (closest to the 1st November 2019), and ethnicity. Other population characteristics will include comorbidities (defined using the Charlson Comorbidity Index).

Population characteristics will be summarised as appropriate: mean, standard deviation, median, minimum and maximum values will be presented for continuous variables and counts and percentages will be presented for categorical and binary variables. Categorical variables will be graphically presented as bar charts and the distribution of continuous variables will be graphed as histograms. Quantitative variables may be categorised into quartiles as required. Missing values will be displayed when appropriate.

Incidence, prevalence and mortality rates will be calculated for each disease for each year from the 1st November 2019 to the date to the most recent data available. Rates will be stratified by age, sex, region, IMD, ethnicity and CCI for each disease for all cohorts and objectives.

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NHS Digital. Quality and Outcomes Framework, 2020-21. NHS Digital, 2021

**Appendix : outcome variable code lists**

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| name | terminology | snomed\_code | variable |
| SNOMED | 106001000119101 | chronic obstructive lung disease co-occurrent with acute bronchitis (disorder) | copd |
| SNOMED | 135836000 | end stage chronic obstructive airways disease (disorder) | copd |
| SNOMED | 13645005 | chronic obstructive lung disease (disorder) | copd |
| SNOMED | 16003001 | giant bullous emphysema (disorder) | copd |
| SNOMED | 16846004 | obstructive emphysema (disorder) | copd |
| SNOMED | 185086009 | chronic obstructive bronchitis (disorder) | copd |
| SNOMED | 195951007 | acute exacerbation of chronic obstructive airways disease (disorder) | copd |
| SNOMED | 195958001 | segmental bullous emphysema (disorder) | copd |
| SNOMED | 195959009 | zonal bullous emphysema (disorder) | copd |
| SNOMED | 196001008 | chronic obstructive pulmonary disease with acute lower respiratory infection (disorder) | copd |
| SNOMED | 233674008 | pulmonary emphysema in alpha-1 primary immunodeficiency deficiency (disorder) | copd |
| SNOMED | 266355005 | bullous emphysema with collapse (disorder) | copd |
| SNOMED | 285381006 | acute infective exacerbation of chronic obstructive airways disease (disorder) | copd |
| SNOMED | 293241000119100 | acute exacerbation of chronic obstructive bronchitis (disorder) | copd |
| SNOMED | 293991000000106 | very severe chronic obstructive pulmonary disease (disorder) | copd |
| SNOMED | 313296004 | mild chronic obstructive pulmonary disease (disorder) | copd |
| SNOMED | 313297008 | moderate chronic obstructive pulmonary disease (disorder) | copd |
| SNOMED | 313299006 | severe chronic obstructive pulmonary disease (disorder) | copd |
| SNOMED | 31898008 | paraseptal emphysema (disorder) | copd |
| SNOMED | 45145000 | unilateral emphysema (situation) | copd |
| SNOMED | 4981000 | panacinar emphysema (disorder) | copd |
| SNOMED | 66110007 | chronic diffuse emphysema caused by inhalation of chemical fumes and/or vapors (disorder) | copd |
| SNOMED | 68328006 | centriacinar emphysema (disorder) | copd |
| SNOMED | 847091000000104 | acute non-infective exacerbation of chronic obstructive pulmonary disease (disorder) | copd |
| SNOMED | 87433001 | pulmonary emphysema (disorder) | copd |
| SNOMED | 408501008 | emergency hospital admission for chronic obstructive pulmonary disease (procedure) | copd |
| SNOMED | 723245007 | number of chronic obstructive pulmonary disease exacerbations in past year (observable entity) | copd |
| SNOMED | 1066231000000103 | chronic obstructive pulmonary disease monitoring email invitation (procedure) | copd |
| SNOMED | 1066281000000104 | chronic obstructive pulmonary disease monitoring short message service text message invitation (procedure) | copd |
| SNOMED | 1066821000000101 | chronic obstructive pulmonary disease monitoring short message service text message first invitation (procedure) | copd |
| SNOMED | 1066841000000108 | chronic obstructive pulmonary disease monitoring short message service text message second invitation (procedure) | copd |
| SNOMED | 1066851000000106 | chronic obstructive pulmonary disease monitoring short message service text message third invitation (procedure) | copd |
| SNOMED | 1110861000000102 | quality and outcomes framework chronic obstructive pulmonary disease quality indicator-related care invitation (procedure) | copd |
| SNOMED | 143371000000104 | quality and outcomes framework chronic obstructive pulmonary disease quality indicator-related care invitation using preferred method of communication (procedure) | copd |
| SNOMED | 711431000000109 | chronic obstructive pulmonary disease monitoring invitation (procedure) | copd |
| SNOMED | 716241000000106 | chronic obstructive pulmonary disease monitoring first letter (procedure) | copd |
| SNOMED | 716281000000103 | chronic obstructive pulmonary disease monitoring verbal invitation (procedure) | copd |
| SNOMED | 716901000000101 | chronic obstructive pulmonary disease monitoring telephone invitation (procedure) | copd |
| SNOMED | 717021000000106 | chronic obstructive pulmonary disease monitoring second letter (procedure) | copd |
| SNOMED | 717521000000104 | chronic obstructive pulmonary disease monitoring third letter (procedure) | copd |
| SNOMED | 716291000000101 | excepted from chronic obstructive pulmonary disease quality indicators - informed dissent (finding) | copd |
| SNOMED | 716311000000100 | excepted from chronic obstructive pulmonary disease quality indicators - patient unsuitable (finding) | copd |
| SNOMED | 1108721000000102 | excepted from chronic obstructive pulmonary disease quality indicators - service unavailable (finding) | copd |
| SNOMED | 941201000000103 | chronic obstructive pulmonary disease resolved (finding) | copd |
| SNOMED | 394703002 | chronic obstructive pulmonary disease annual review (regime/therapy) | copd |
| SNOMED | 760601000000107 | chronic obstructive pulmonary disease 3 monthly review (regime/therapy) | copd |
| SNOMED | 760621000000103 | chronic obstructive pulmonary disease 6 monthly review (regime/therapy) | copd |
| SNOMED | 371611000000107 | chronic obstructive pulmonary disease patient unsuitable for pulmonary rehabilitation (finding) | copd |
| SNOMED | 836477007 | chronic emphysema caused by vapor (disorder) | copd |
| SNOMED | 1010333003 | emphysema of left lung (disorder) | copd |
| SNOMED | 1010334009 | emphysema of right lung (disorder) | copd |

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| name | terminology | snomed\_code | variable |
| SNOMED | 1064811000000103 | moderate acute exacerbation of asthma (disorder) | asthma |
| SNOMED | 1064821000000109 | life threatening acute exacerbation of asthma (disorder) | asthma |
| SNOMED | 10674711000119105 | acute severe exacerbation of asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10675391000119101 | severe controlled persistent asthma (disorder) | asthma |
| SNOMED | 10675431000119106 | severe persistent allergic asthma (disorder) | asthma |
| SNOMED | 10675471000119109 | acute severe exacerbation of severe persistent allergic asthma (disorder) | asthma |
| SNOMED | 10675551000119104 | acute severe exacerbation of severe persistent asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10675591000119109 | severe persistent allergic asthma controlled (finding) | asthma |
| SNOMED | 10675631000119109 | severe persistent asthma controlled co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10675671000119107 | severe persistent allergic asthma uncontrolled (finding) | asthma |
| SNOMED | 10675711000119106 | severe persistent asthma uncontrolled co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10675751000119107 | severe uncontrolled persistent asthma (disorder) | asthma |
| SNOMED | 10675871000119106 | mild persistent allergic asthma (disorder) | asthma |
| SNOMED | 10675911000119109 | acute severe exacerbation of mild persistent allergic asthma (disorder) | asthma |
| SNOMED | 10675991000119100 | acute severe exacerbation of mild persistent allergic asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10676031000119106 | mild persistent allergic asthma controlled (finding) | asthma |
| SNOMED | 10676071000119109 | mild persistent asthma controlled (finding) | asthma |
| SNOMED | 10676111000119102 | mild persistent asthma controlled co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10676151000119101 | mild persistent allergic asthma uncontrolled (finding) | asthma |
| SNOMED | 10676191000119106 | mild persistent asthma uncontrolled (finding) | asthma |
| SNOMED | 10676231000119102 | mild persistent asthma uncontrolled co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10676351000119103 | moderate persistent asthma controlled (finding) | asthma |
| SNOMED | 10676391000119108 | moderate persistent allergic asthma (disorder) | asthma |
| SNOMED | 10676431000119103 | acute severe exacerbation of moderate persistent allergic asthma (disorder) | asthma |
| SNOMED | 10676511000119109 | acute severe exacerbation of moderate persistent asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10676551000119105 | moderate persistent allergic asthma controlled (finding) | asthma |
| SNOMED | 10676591000119100 | moderate persistent controlled asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10676631000119100 | moderate persistent allergic asthma uncontrolled (finding) | asthma |
| SNOMED | 10676671000119102 | moderate persistent asthma uncontrolled co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 10676711000119103 | moderate persistent asthma uncontrolled (finding) | asthma |
| SNOMED | 10692721000119102 | chronic obstructive asthma co-occurrent with acute exacerbation of asthma (disorder) | asthma |
| SNOMED | 10742121000119104 | asthma in mother complicating childbirth (disorder) | asthma |
| SNOMED | 1086701000000102 | life threatening acute exacerbation of allergic asthma (disorder) | asthma |
| SNOMED | 1086711000000100 | life threatening acute exacerbation of intrinsic asthma (disorder) | asthma |
| SNOMED | 1103911000000103 | severe asthma with fungal sensitisation (disorder) | asthma |
| SNOMED | 11641008 | millers' asthma (disorder) | asthma |
| SNOMED | 12428000 | intrinsic asthma without status asthmaticus (disorder) | asthma |
| SNOMED | 124991000119109 | severe persistent asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 125001000119103 | moderate persistent asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 125011000119100 | mild persistent asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 125021000119107 | intermittent asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 135171000119106 | acute exacerbation of moderate persistent asthma (disorder) | asthma |
| SNOMED | 135181000119109 | acute exacerbation of mild persistent asthma (disorder) | asthma |
| SNOMED | 16584951000119101 | oral steroid-dependent asthma (disorder) | asthma |
| SNOMED | 1741000119102 | intermittent asthma uncontrolled (disorder) | asthma |
| SNOMED | 1751000119100 | acute exacerbation of chronic obstructive airways disease with asthma (disorder) | asthma |
| SNOMED | 18041002 | printers' asthma (disorder) | asthma |
| SNOMED | 195949008 | chronic asthmatic bronchitis (disorder) | asthma |
| SNOMED | 195967001 | asthma (disorder) | asthma |
| SNOMED | 195977004 | mixed asthma (disorder) | asthma |
| SNOMED | 225057002 | brittle asthma (disorder) | asthma |
| SNOMED | 233679003 | late onset asthma (disorder) | asthma |
| SNOMED | 233683003 | hay fever with asthma (disorder) | asthma |
| SNOMED | 233688007 | sulfite-induced asthma (disorder) | asthma |
| SNOMED | 233691007 | asthmatic pulmonary eosinophilia (disorder) | asthma |
| SNOMED | 2360001000004109 | steroid dependent asthma (disorder) | asthma |
| SNOMED | 266361008 | non-allergic asthma (disorder) | asthma |
| SNOMED | 281239006 | exacerbation of asthma (disorder) | asthma |
| SNOMED | 30352005 | allergic-infective asthma (disorder) | asthma |
| SNOMED | 304527002 | acute asthma (disorder) | asthma |
| SNOMED | 312453004 | asthma - currently active (finding) | asthma |
| SNOMED | 31387002 | exercise-induced asthma (disorder) | asthma |
| SNOMED | 34015007 | bakers' asthma (disorder) | asthma |
| SNOMED | 370218001 | mild asthma (disorder) | asthma |
| SNOMED | 370219009 | moderate asthma (disorder) | asthma |
| SNOMED | 370220003 | occasional asthma (disorder) | asthma |
| SNOMED | 370221004 | severe asthma (disorder) | asthma |
| SNOMED | 389145006 | allergic asthma (disorder) | asthma |
| SNOMED | 395022009 | asthma night-time symptoms (finding) | asthma |
| SNOMED | 401000119107 | asthma with irreversible airway obstruction (disorder) | asthma |
| SNOMED | 401193004 | asthma confirmed (situation) | asthma |
| SNOMED | 404804003 | platinum asthma (disorder) | asthma |
| SNOMED | 404806001 | cheese-makers' asthma (disorder) | asthma |
| SNOMED | 404808000 | isocyanate induced asthma (disorder) | asthma |
| SNOMED | 405944004 | asthmatic bronchitis (disorder) | asthma |
| SNOMED | 407674008 | aspirin-induced asthma (disorder) | asthma |
| SNOMED | 409663006 | cough variant asthma (disorder) | asthma |
| SNOMED | 41553006 | detergent asthma (disorder) | asthma |
| SNOMED | 418395004 | tea-makers' asthma (disorder) | asthma |
| SNOMED | 423889005 | non-immunoglobulin e mediated allergic asthma (disorder) | asthma |
| SNOMED | 424199006 | substance induced asthma (disorder) | asthma |
| SNOMED | 424643009 | immunoglobulin e-mediated allergic asthma (disorder) | asthma |
| SNOMED | 425969006 | exacerbation of intermittent asthma (disorder) | asthma |
| SNOMED | 426656000 | severe persistent asthma (disorder) | asthma |
| SNOMED | 426979002 | mild persistent asthma (disorder) | asthma |
| SNOMED | 427295004 | moderate persistent asthma (disorder) | asthma |
| SNOMED | 427603009 | intermittent asthma (disorder) | asthma |
| SNOMED | 427679007 | mild intermittent asthma (disorder) | asthma |
| SNOMED | 442025000 | acute exacerbation of chronic asthmatic bronchitis (disorder) | asthma |
| SNOMED | 445427006 | seasonal asthma (disorder) | asthma |
| SNOMED | 55570000 | asthma without status asthmaticus (disorder) | asthma |
| SNOMED | 56968009 | asthma caused by wood dust (disorder) | asthma |
| SNOMED | 57607007 | occupational asthma (disorder) | asthma |
| SNOMED | 63088003 | allergic asthma without status asthmaticus (disorder) | asthma |
| SNOMED | 641000119106 | intermittent asthma well controlled (finding) | asthma |
| SNOMED | 703953004 | allergic asthma caused by dermatophagoides pteronyssinus (disorder) | asthma |
| SNOMED | 703954005 | allergic asthma caused by dermatophagoides farinae (disorder) | asthma |
| SNOMED | 707444001 | uncomplicated asthma (disorder) | asthma |
| SNOMED | 707445000 | exacerbation of mild persistent asthma (disorder) | asthma |
| SNOMED | 707446004 | exacerbation of moderate persistent asthma (disorder) | asthma |
| SNOMED | 707447008 | exacerbation of severe persistent asthma (disorder) | asthma |
| SNOMED | 707511009 | uncomplicated mild persistent asthma (disorder) | asthma |
| SNOMED | 707512002 | uncomplicated moderate persistent asthma (disorder) | asthma |
| SNOMED | 707513007 | uncomplicated severe persistent asthma (disorder) | asthma |
| SNOMED | 707979007 | acute severe exacerbation of severe persistent asthma (disorder) | asthma |
| SNOMED | 707980005 | acute severe exacerbation of moderate persistent asthma (disorder) | asthma |
| SNOMED | 707981009 | acute severe exacerbation of mild persistent asthma (disorder) | asthma |
| SNOMED | 708038006 | acute exacerbation of asthma (disorder) | asthma |
| SNOMED | 708090002 | acute severe exacerbation of asthma (disorder) | asthma |
| SNOMED | 708093000 | acute exacerbation of immunoglobulin e-mediated allergic asthma (disorder) | asthma |
| SNOMED | 708094006 | acute exacerbation of intrinsic asthma (disorder) | asthma |
| SNOMED | 708095007 | acute severe exacerbation of immunoglobin e-mediated allergic asthma (disorder) | asthma |
| SNOMED | 708096008 | acute severe exacerbation of intrinsic asthma (disorder) | asthma |
| SNOMED | 72301000119103 | asthma in pregnancy (disorder) | asthma |
| SNOMED | 733858005 | acute severe refractory exacerbation of asthma (disorder) | asthma |
| SNOMED | 734904007 | life threatening acute exacerbation of asthma (disorder) | asthma |
| SNOMED | 734905008 | moderate acute exacerbation of asthma (disorder) | asthma |
| SNOMED | 735587000 | acute severe exacerbation of asthma co-occurrent and due to allergic asthma (disorder) | asthma |
| SNOMED | 735588005 | uncomplicated allergic asthma (disorder) | asthma |
| SNOMED | 735589002 | uncomplicated non-allergic asthma (disorder) | asthma |
| SNOMED | 762521001 | exacerbation of allergic asthma (disorder) | asthma |
| SNOMED | 782513000 | acute severe exacerbation of allergic asthma (disorder) | asthma |
| SNOMED | 782520007 | exacerbation of allergic asthma due to infection (disorder) | asthma |
| SNOMED | 786836003 | near fatal asthma (disorder) | asthma |
| SNOMED | 866881000000101 | chronic asthma with fixed airflow obstruction (disorder) | asthma |
| SNOMED | 92807009 | chemical-induced asthma (disorder) | asthma |
| SNOMED | 93432008 | drug-induced asthma (disorder) | asthma |
| SNOMED | 99031000119107 | acute exacerbation of asthma co-occurrent with allergic rhinitis (disorder) | asthma |
| SNOMED | 183478001 | emergency hospital admission for asthma (procedure) | asthma |
| SNOMED | 708358003 | emergency asthma admission since last encounter (situation) | asthma |
| SNOMED | 443117005 | asthma control test score (observable entity) | asthma |
| SNOMED | 763077003 | asthma control questionnaire score (observable entity) | asthma |
| SNOMED | 905301000000103 | childhood asthma control test score (observable entity) | asthma |
| SNOMED | 366874008 | number of asthma exacerbations in past year (observable entity) | asthma |
| SNOMED | 1110841000000103 | quality and outcomes framework asthma quality indicator-related care invitation (procedure) | asthma |
| SNOMED | 185731000 | asthma monitoring call first letter (procedure) | asthma |
| SNOMED | 185732007 | asthma monitoring call second letter (procedure) | asthma |
| SNOMED | 185734008 | asthma monitoring call third letter (procedure) | asthma |
| SNOMED | 185735009 | asthma monitoring call verbal invite (procedure) | asthma |
| SNOMED | 185736005 | asthma monitoring call telephone invite (procedure) | asthma |
| SNOMED | 92161000000104 | quality and outcomes framework asthma quality indicator-related care invitation using preferred method of communication (procedure) | asthma |
| SNOMED | 928451000000107 | asthma monitoring invitation short message service text message (procedure) | asthma |
| SNOMED | 928511000000107 | asthma monitoring invitation email (procedure) | asthma |
| SNOMED | 959401000000101 | asthma monitoring short message service text message first invitation (procedure) | asthma |
| SNOMED | 959421000000105 | asthma monitoring short message service text message second invitation (procedure) | asthma |
| SNOMED | 959441000000103 | asthma monitoring short message service text message third invitation (procedure) | asthma |
| SNOMED | 716491000000100 | excepted from asthma quality indicators - informed dissent (finding) | asthma |
| SNOMED | 717291000000103 | excepted from asthma quality indicators - patient unsuitable (finding) | asthma |
| SNOMED | 1108701000000106 | excepted from asthma quality indicators - service unavailable (finding) | asthma |
| SNOMED | 162660004 | asthma resolved (finding) | asthma |
| SNOMED | 170631002 | asthma disturbing sleep (finding) | asthma |
| SNOMED | 170632009 | asthma causing night waking (finding) | asthma |
| SNOMED | 170633004 | asthma disturbs sleep weekly (finding) | asthma |
| SNOMED | 170634005 | asthma disturbs sleep frequently (finding) | asthma |
| SNOMED | 170635006 | asthma not disturbing sleep (finding) | asthma |
| SNOMED | 170636007 | asthma never disturbs sleep (finding) | asthma |
| SNOMED | 170637003 | asthma limiting activities (finding) | asthma |
| SNOMED | 170638008 | asthma not limiting activities (finding) | asthma |
| SNOMED | 170655007 | asthma restricts exercise (finding) | asthma |
| SNOMED | 170656008 | asthma sometimes restricts exercise (finding) | asthma |
| SNOMED | 170657004 | asthma severely restricts exercise (finding) | asthma |
| SNOMED | 170658009 | asthma never restricts exercise (finding) | asthma |
| SNOMED | 270442000 | asthma monitoring check done (finding) | asthma |
| SNOMED | 370202007 | asthma causes daytime symptoms 1 to 2 times per month (finding) | asthma |
| SNOMED | 370203002 | asthma causes daytime symptoms 1 to 2 times per week (finding) | asthma |
| SNOMED | 370204008 | asthma causes daytime symptoms most days (finding) | asthma |
| SNOMED | 370205009 | asthma causes night symptoms 1 to 2 times per month (finding) | asthma |
| SNOMED | 370206005 | asthma limits walking on the flat (finding) | asthma |
| SNOMED | 370207001 | asthma limits walking up hills or stairs (finding) | asthma |
| SNOMED | 370208006 | asthma never causes daytime symptoms (finding) | asthma |
| SNOMED | 373899003 | asthma daytime symptoms (finding) | asthma |
| SNOMED | 390872009 | change in asthma management plan (regime/therapy) | asthma |
| SNOMED | 390877003 | step up change in asthma management plan (regime/therapy) | asthma |
| SNOMED | 390878008 | step down change in asthma management plan (regime/therapy) | asthma |
| SNOMED | 390921001 | absent from work or school due to asthma (finding) | asthma |
| SNOMED | 394700004 | asthma annual review (regime/therapy) | asthma |
| SNOMED | 394701000 | asthma follow-up (regime/therapy) | asthma |
| SNOMED | 394720003 | asthma medication review (procedure) | asthma |
| SNOMED | 401182001 | asthma monitoring by nurse (regime/therapy) | asthma |
| SNOMED | 401183006 | asthma monitoring by doctor (regime/therapy) | asthma |
| SNOMED | 473391009 | asthma never causes night symptoms (situation) | asthma |
| SNOMED | 754061000000100 | asthma review using royal college of physicians three questions (regime/therapy) | asthma |
| SNOMED | 771901000000100 | asthma causes night time symptoms 1 to 2 times per week (finding) | asthma |
| SNOMED | 771941000000102 | asthma causes symptoms most nights (finding) | asthma |
| SNOMED | 771981000000105 | asthma limits activities 1 to 2 times per month (finding) | asthma |
| SNOMED | 772011000000107 | asthma limits activities 1 to 2 times per week (finding) | asthma |
| SNOMED | 772051000000106 | asthma limits activities most days (finding) | asthma |
| SNOMED | 811151000000105 | number of days absent from school due to asthma in past 6 months (observable entity) | asthma |
| SNOMED | 527171000000103 | patient has a written asthma personal action plan (finding) | asthma |
| SNOMED | 810901000000102 | asthma self-management plan review (procedure) | asthma |
| SNOMED | 811921000000103 | asthma self-management plan agreed (finding) | asthma |
| SNOMED | 10674991000119104 | intermittent allergic asthma (disorder) | asthma |
| SNOMED | 829976001 | thunderstorm asthma (disorder) | asthma |
| SNOMED | 782559003 | asthma never causes night symptoms (finding) | asthma |

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| name | terminology | snomed\_code | variable |
| SNOMED | 233748006 | simple pneumoconiosis (disorder) | ILD |
| SNOMED | 233749003 | complicated pneumoconiosis (disorder) | ILD |
| SNOMED | 233750003 | erionite pneumoconiosis (disorder) | ILD |
| SNOMED | 233751004 | metal pneumoconiosis (disorder) | ILD |
| SNOMED | 233754007 | cerium pneumoconiosis (disorder) | ILD |
| SNOMED | 233755008 | nickel pneumoconiosis (disorder) | ILD |
| SNOMED | 233756009 | thorium pneumoconiosis (disorder) | ILD |
| SNOMED | 233757000 | zirconium pneumoconiosis (disorder) | ILD |
| SNOMED | 233758005 | mica pneumoconiosis (disorder) | ILD |
| SNOMED | 233759002 | mixed mineral dust pneumoconiosis (disorder) | ILD |
| SNOMED | 233761006 | subacute silicosis (disorder) | ILD |
| SNOMED | 233762004 | chronic silicosis (disorder) | ILD |
| SNOMED | 233764003 | wollastonite pneumoconiosis (disorder) | ILD |
| SNOMED | 26511004 | pneumoconiosis caused by sisal fiber (disorder) | ILD |
| SNOMED | 29422001 | coal workers' pneumoconiosis (disorder) | ILD |
| SNOMED | 32139003 | mixed dust pneumoconiosis (disorder) | ILD |
| SNOMED | 398640008 | rheumatoid pneumoconiosis (disorder) | ILD |
| SNOMED | 40122008 | pneumoconiosis (disorder) | ILD |
| SNOMED | 40218008 | carbon electrode makers' pneumoconiosis (disorder) | ILD |
| SNOMED | 426853005 | pneumoconiosis caused by silicate (disorder) | ILD |
| SNOMED | 58691003 | antimony pneumoconiosis (disorder) | ILD |
| SNOMED | 73144008 | pneumoconiosis caused by talc (disorder) | ILD |
| SNOMED | 805002 | pneumoconiosis caused by silica (disorder) | ILD |
| SNOMED | 87909002 | hard metal pneumoconiosis (disorder) | ILD |
| SNOMED | 32544004 | chronic obliterative bronchiolitis caused by inhalation of chemical fumes and/or vapors (disorder) | ILD |
| SNOMED | 37711000 | cadmium pneumonitis (disorder) | ILD |
| SNOMED | 47515009 | simple silicosis (disorder) | ILD |
| SNOMED | 8549006 | desquamative interstitial pneumonia (disorder) | ILD |
| SNOMED | 236302005 | acute interstitial pneumonia (disorder) | ILD |
| SNOMED | 35037009 | primary atypical interstitial pneumonia (disorder) | ILD |
| SNOMED | 385479009 | follicular bronchiolitis (disorder) | ILD |
| SNOMED | 4120002 | bronchiolitis (disorder) | ILD |
| SNOMED | 430476004 | diffuse panbronchiolitis (disorder) | ILD |
| SNOMED | 59903001 | acute obliterating bronchiolitis (disorder) | ILD |
| SNOMED | 64667001 | interstitial pneumonia (disorder) | ILD |
| SNOMED | 704345008 | chronic interstitial pneumonia (disorder) | ILD |
| SNOMED | 10713006 | diffuse interstitial rheumatoid disease of lung (disorder) | ILD |
| SNOMED | 129452008 | nonspecific interstitial pneumonia (disorder) | ILD |
| SNOMED | 196051003 | drug-induced interstitial lung disorder (disorder) | ILD |
| SNOMED | 196133001 | lung disease with systemic sclerosis (disorder) | ILD |
| SNOMED | 233692000 | cryptogenic pulmonary eosinophilia (disorder) | ILD |
| SNOMED | 233770009 | stage 4 pulmonary sarcoidosis (disorder) | ILD |
| SNOMED | 24369008 | pulmonary sarcoidosis (disorder) | ILD |
| SNOMED | 30042003 | confluent fibrosis of lung (disorder) | ILD |
| SNOMED | 34371004 | subacute obliterative bronchiolitis caused by inhalation of chemical fumes and/or vapors (disorder) | ILD |
| SNOMED | 3514002 | peribronchial fibrosis of lung (disorder) | ILD |
| SNOMED | 405570007 | pulmonary fibrosis due to and following radiotherapy (disorder) | ILD |
| SNOMED | 427046006 | drug-induced pneumonitis (disorder) | ILD |
| SNOMED | 54867000 | rheumatoid fibrosing alveolitis (disorder) | ILD |
| SNOMED | 56841008 | massive fibrosis of lung (disorder) | ILD |
| SNOMED | 700249006 | idiopathic interstitial pneumonia (disorder) | ILD |
| SNOMED | 707434003 | pulmonary fibrosis due to hermansky-pudlak syndrome (disorder) | ILD |
| SNOMED | 719218000 | cryptogenic organizing pneumonia (disorder) | ILD |
| SNOMED | 733453005 | congenital nephrotic syndrome, interstitial lung disease, epidermolysis bullosa syndrome (disorder) | ILD |
| SNOMED | 737181009 | interstitial lung disease due to systemic disease (disorder) | ILD |
| SNOMED | 737182002 | interstitial lung disease due to granulomatous disease (disorder) | ILD |
| SNOMED | 737183007 | interstitial lung disease due to metabolic disease (disorder) | ILD |
| SNOMED | 737184001 | interstitial lung disease co-occurrent and due to systemic vasculitis (disorder) | ILD |
| SNOMED | 155621007 | rheumatoid lung (disorder) | ILD |
| SNOMED | 196132006 | rheumatoid lung (disorder) | ILD |
| SNOMED | 201794001 | rheumatoid lung (disorder) | ILD |
| SNOMED | 201813004 | (rheumatoid lung) or (caplan's syndrome) or (fibrosing alveolitis associated with rheumatoid arthritis) (disorder) | ILD |
| SNOMED | 239794002 | fibrosing alveolitis associated with rheumatoid arthritis (disorder) | ILD |
| SNOMED | 319841000119107 | rheumatoid lung disease with rheumatoid arthritis (disorder) | ILD |
| SNOMED | 398726004 | rheumatoid lung disease (disorder) | ILD |
| SNOMED | 129451001 | respiratory bronchiolitis associated interstitial lung disease (disorder) | ILD |
| SNOMED | 129458007 | bronchiolitis obliterans organizing pneumonia (disorder) | ILD |
| SNOMED | 14700006 | bauxite fibrosis of lung (disorder) | ILD |
| SNOMED | 17385007 | graphite fibrosis of lung (disorder) | ILD |
| SNOMED | 17996008 | pneumoconiosis caused by inorganic dust (disorder) | ILD |
| SNOMED | 192658007 | giant cell interstitial pneumonitis (disorder) | ILD |
| SNOMED | 196027008 | toxic bronchiolitis obliterans (disorder) | ILD |
| SNOMED | 196053000 | chronic drug-induced interstitial lung disorders (disorder) | ILD |
| SNOMED | 196125002 | diffuse interstitial pulmonary fibrosis (disorder) | ILD |
| SNOMED | 22607003 | asbestosis (disorder) | ILD |
| SNOMED | 233673002 | drug-induced bronchiolitis obliterans (disorder) | ILD |
| SNOMED | 233703007 | interstitial lung disease (disorder) | ILD |
| SNOMED | 233713004 | seasonal cryptogenic organizing pneumonia with biochemical cholestasis (disorder) | ILD |
| SNOMED | 233723008 | bronchiolitis obliterans with usual interstitial pneumonitis (disorder) | ILD |
| SNOMED | 233724002 | toxic diffuse interstitial pulmonary fibrosis (disorder) | ILD |
| SNOMED | 233725001 | drug-induced diffuse interstitial pulmonary fibrosis (disorder) | ILD |
| SNOMED | 233760007 | acute silicosis (disorder) | ILD |
| SNOMED | 277844007 | pulmonary lymphangioleiomyomatosis (disorder) | ILD |
| SNOMED | 36599006 | chronic fibrosis of lung (disorder) | ILD |
| SNOMED | 40100001 | obliterative bronchiolitis (disorder) | ILD |
| SNOMED | 40527005 | idiopathic pulmonary hemosiderosis (disorder) | ILD |
| SNOMED | 40640008 | massive fibrosis of lung co-occurrent and due to silicosis (disorder) | ILD |
| SNOMED | 427123006 | interstitial lung disease due to collagen vascular disease (disorder) | ILD |
| SNOMED | 44274007 | lymphoid interstitial pneumonia (disorder) | ILD |
| SNOMED | 47938003 | chronic obliterative bronchiolitis (disorder) | ILD |
| SNOMED | 51615001 | fibrosis of lung (disorder) | ILD |
| SNOMED | 62371005 | pulmonary siderosis (disorder) | ILD |
| SNOMED | 711379004 | interstitial lung disease due to connective tissue disease (disorder) | ILD |
| SNOMED | 71193007 | fibrosis of lung caused by radiation (disorder) | ILD |
| SNOMED | 72270005 | collagenous pneumoconiosis (disorder) | ILD |
| SNOMED | 196136009 | lung disease co-occurrent with polymyositis (disorder) | ILD |
| SNOMED | 836478002 | subacute obliterative bronchiolitis caused by chemical fumes (disorder) | ILD |
| SNOMED | 836479005 | subacute obliterative bronchiolitis caused by vapor (disorder) | ILD |
| SNOMED | 840350008 | chronic obliterative bronchiolitis caused by chemical fumes (disorder) | ILD |
| SNOMED | 840351007 | chronic obliterative bronchiolitis caused by vapor (disorder) | ILD |
| SNOMED | 866103007 | interstitial lung disease due to juvenile polymyositis (disorder) | ILD |
| SNOMED | 239297008 | lymphomatoid granulomatosis of lung (disorder) | ILD |
| SNOMED | 870573008 | interstitial pneumonia with autoimmune features (disorder) | ILD |
| SNOMED | 1017196003 | interstitial pulmonary fibrosis due to inhalation of substance (disorder) | ILD |
| SNOMED | 1017197007 | interstitial pulmonary fibrosis due to inhalation of drug (disorder) | ILD |
| SNOMED | 700252003 | subacute idiopathic pulmonary fibrosis (disorder) | ILD |
| SNOMED | 708537005 | acute idiopathic pulmonary fibrosis (disorder) | ILD |
| SNOMED | 426437004 | familial idiopathic pulmonary fibrosis (disorder) | ILD |
| SNOMED | 700250006 | idiopathic pulmonary fibrosis (disorder) | ILD |
| SNOMED | 700251005 | chronic idiopathic pulmonary fibrosis (disorder) | ILD |
| SNOMED | 789574002 | acute exacerbation of idiopathic pulmonary fibrosis (disorder) | ILD |

1. Current approvals extend for about three years from June 2020, although we envisage that we should be able to extend these for some projects looking at longer term outcomes, if needed. [↑](#footnote-ref-1)