



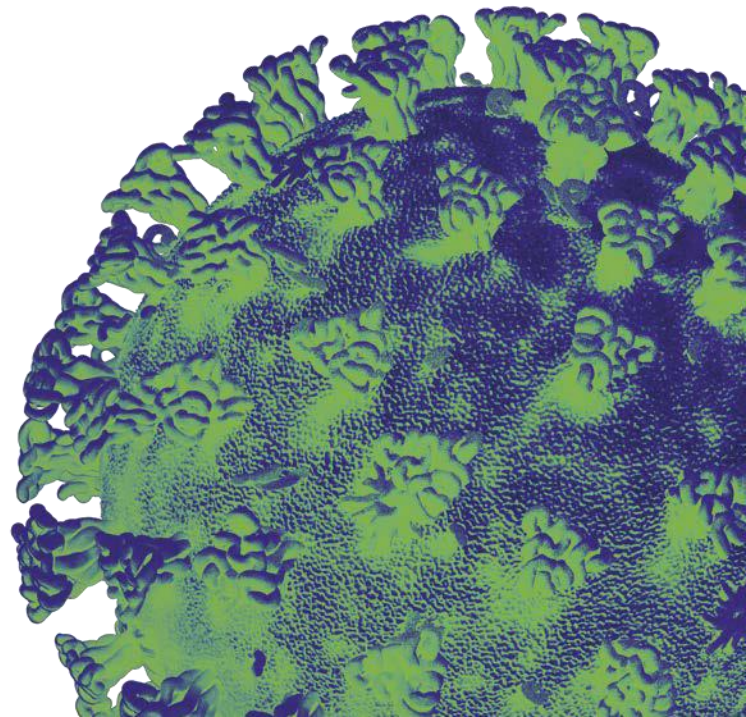
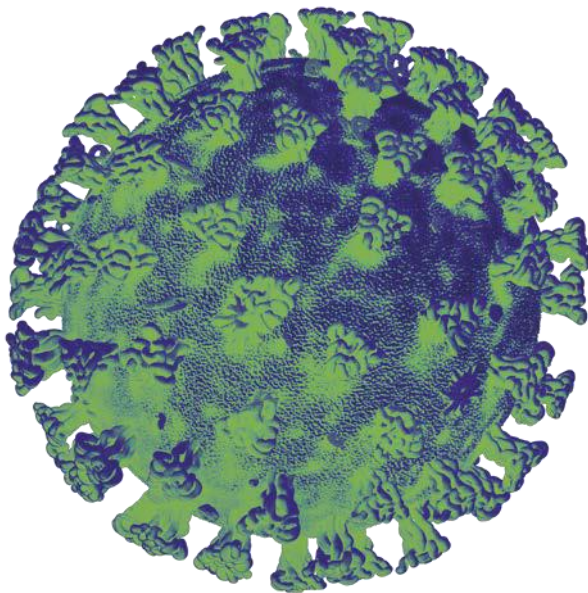
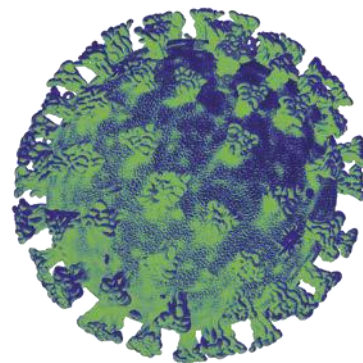
Llywodraeth Cymru
Welsh Government

Technical Advisory Group

Winter modelling update

Modelling other viruses

February 2022



Modelling other respiratory viruses

Welsh Government COVID-19 TAG Policy Modelling Subgroup

1. Summary

1. This paper outlines a number of modelling scenarios relating to (non-COVID-19) respiratory admissions to compliment the [regular update of COVID-19 models](#) that we publish.¹
2. We are currently at Alert level zero in Wales, with some non-pharmaceutical interventions (NPIs) in place. People were mixing with others more in the early part of this winter than they were last winter opening up the potential for spread of not just COVID-19 but other respiratory viruses too.
3. In August/September 2021 a [paper](#) was published on winter modelling.
4. In some years there would be merit in modelling for norovirus and other viruses of the type which often lead to problems in the health system during the busy winter period if hospital bed bays or wards need to be closed due to outbreaks.
5. Modelling referenced in the previous [winter modelling report](#) suggested there was potential for a greater than normal sized flu and RSV season in the winter of 2021/22, possibly shifted in time from their normal peak. However, **data so far suggests we are currently in another low season of lesser concern this winter when compared with other pressures on the NHS (medium confidence)**. Modelling suggests there may still be a sizeable susceptible population for RSV however (low confidence).
6. This may lead to a delayed peak in respiratory admissions which would lead to further pressures on the NHS in the future. This increase in respiratory admissions may occur because immunity to respiratory illnesses has not been built up in the population as usual due to limited social contact resulting from social distancing and further COVID-19 population protections.
7. Continued surveillance of infections in schools, supply, uptake and effectiveness of vaccines, and impact and spread of COVID-19 variants is important to help us understand what trajectory Wales is following in terms of COVID-19 and other respiratory illnesses.

¹The most recent COVID-19 policy modelling paper published 11 January 2022 can be found [here](#).

2. Historical hospital admissions due to respiratory illness

Respiratory admissions tend to be seasonal with a peak occurring around early January each year. Since 2020, this peak has not been observed.

Figure 1: Respiratory admissions time series for Wales (DHCW data)

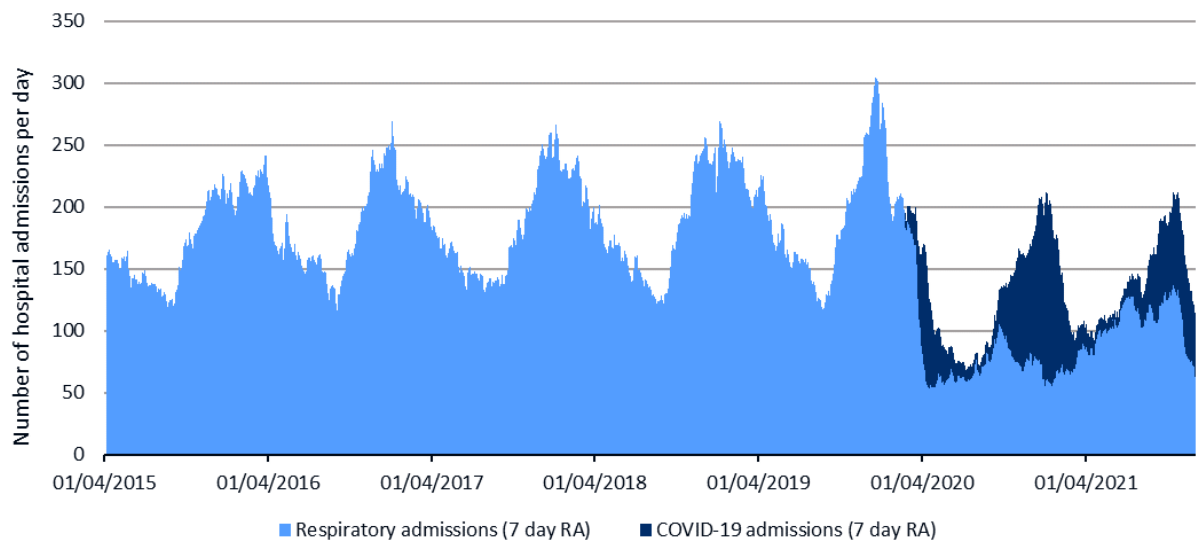


Figure 2: Respiratory admissions (7 day rolling average) by financial year

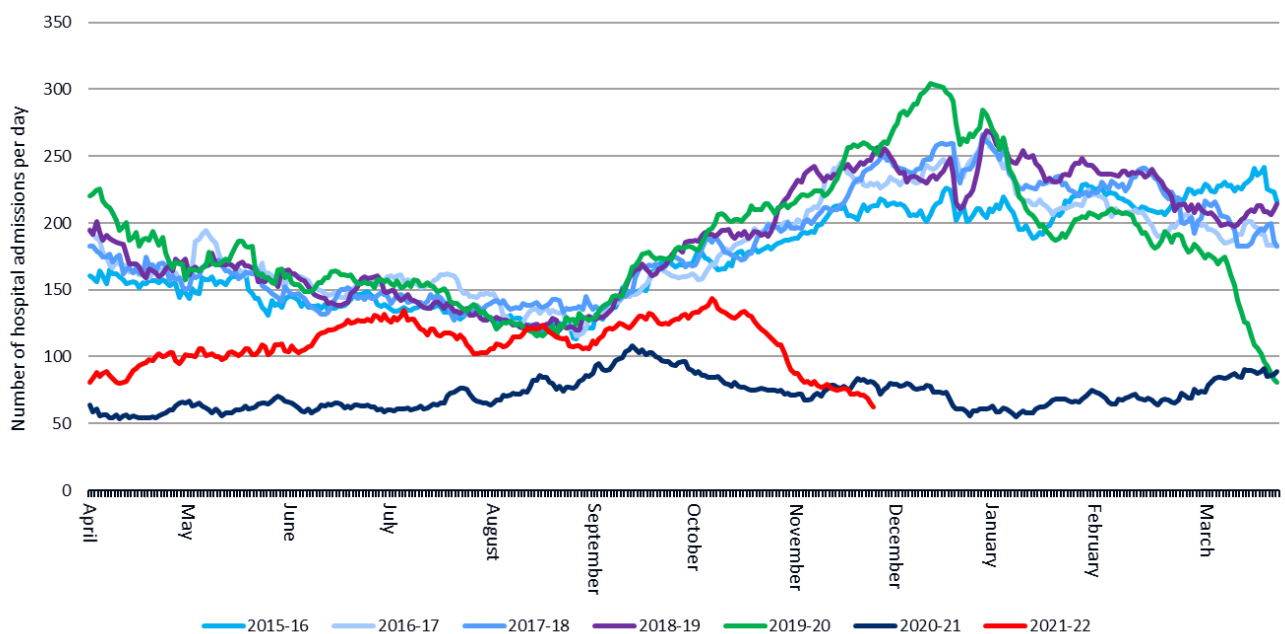
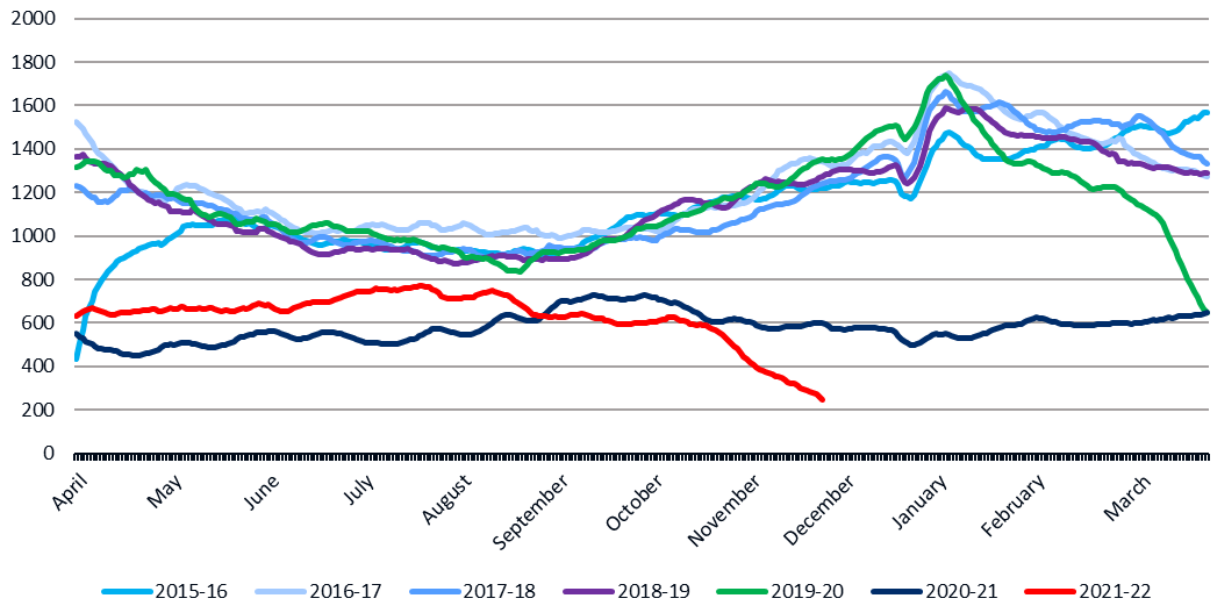


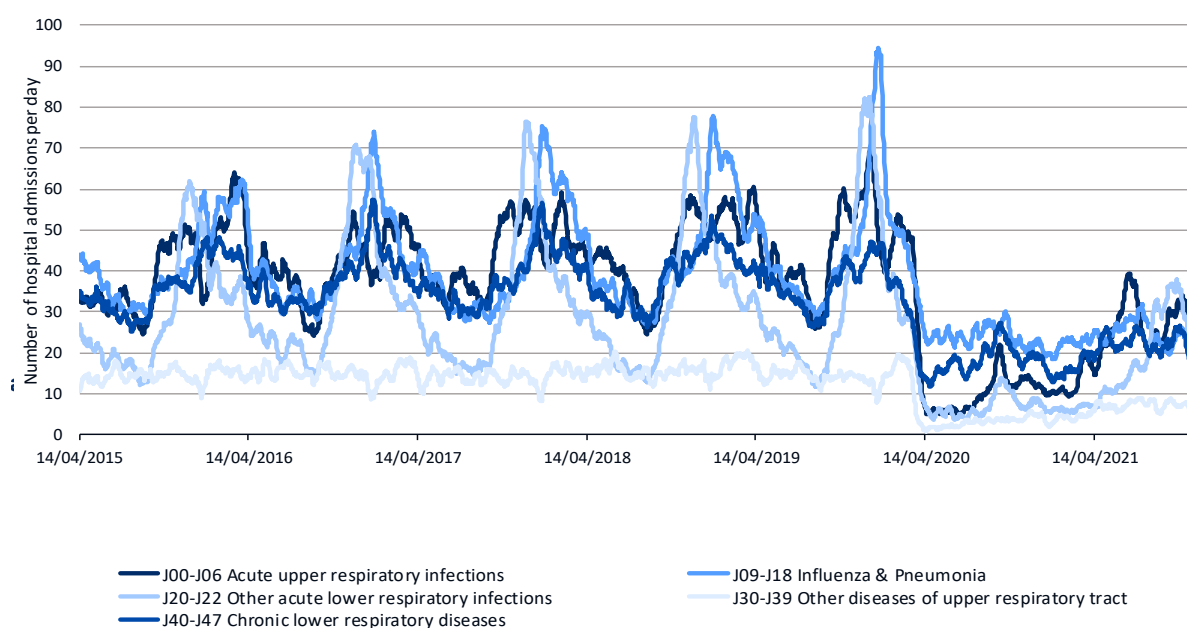
Figure 3: Total number of beds occupied due to respiratory illness per day (7 day rolling average), by financial year



Note: data was made available on 16 December 2021 but data has only been included up to 30 November 2021 due to reporting/coding lag. The most recent twelve days of admissions data has been disregarded for reasons of data quality. Further inspection of the November admissions data suggests it is of sufficient quality and so the decline in this type of admission in November 2021 appears genuine.

Respiratory admissions have been running below historical levels since the beginning of 2020. Recently they have dipped even below last year's (COVID-19-affected) level.

Figure 4: Respiratory admissions (14 day rolling average), by respiratory illness



Source: Digital Health and Care Wales

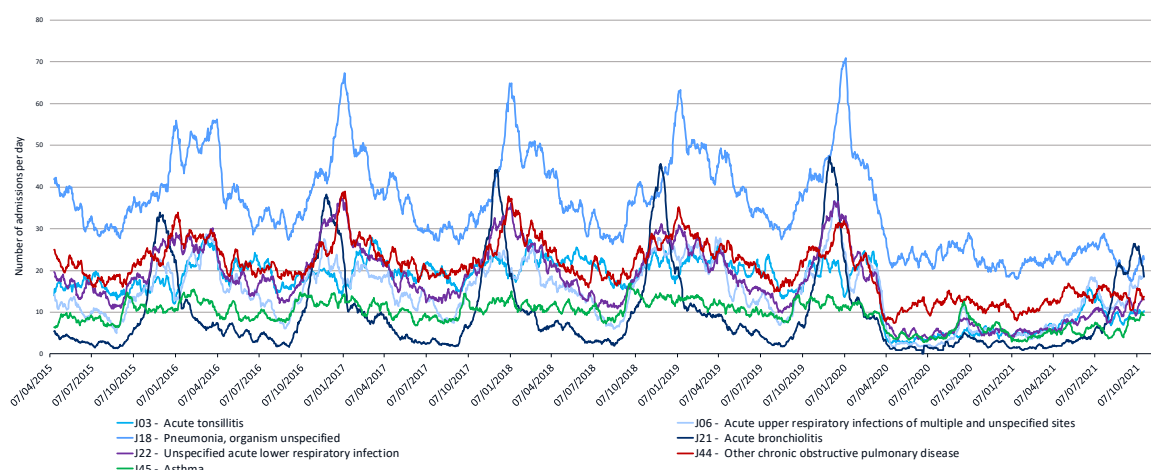
Note: only the five most hospitalised respiratory subtypes shown. Data was made available on 16 December 2021 but data has only been included up to 30 November 2021 due to reporting lag.

All five non-covid respiratory illness subtypes saw a decline after March 2020 which has persisted. Most of the groups (except J30 - J39 relating to polyps abscesses and cysts) had been seasonal until then, but much of the seasonality disappeared and what peaks remained peaked below previous troughs. For all five subtypes, a non-seasonal background rate remained, but at lower levels than observed before.

After March 2020, the subtype acute upper respiratory tract infection (J00-06) had the highest peak in daily admissions at 39 (24 June to 2 July 2021). This contrasts with acute upper respiratory tract infection (J00-06) daily admissions peaking at over 60 in 2019.

The respiratory illness subtype with the next highest number of daily admissions after March 2020 was other acute lower respiratory infections (J20-22) with 38 daily admissions (on 10 October 2021). Contrast this with other acute lower respiratory infections (J20-22) admissions peaking at over 80 in 2019.

Figure 5: Respiratory admissions (14 day rolling average) by respiratory illness type



Source: Digital Health and Care Wales

Note: only the seven most hospitalised respiratory illness types shown. Data was made available on 16 December 2021 but data has only been included up to 30 November 2021 due to reporting lag.

All seven specific respiratory illness types included in chart 5 saw a decline after March 2020 which has persisted. All seven types had been seasonal but much of the seasonality disappeared after March 2020. The peaks that remained peaked below previous troughs in almost all of the period from March 2020 to June 2021. Each respiratory illness types saw upticks in the second half of 2021 but below their previous peaks. In particular, daily admissions due to acute bronchiolitis (J21) increased sharply.

Welsh Government RSV Modelling Scenarios

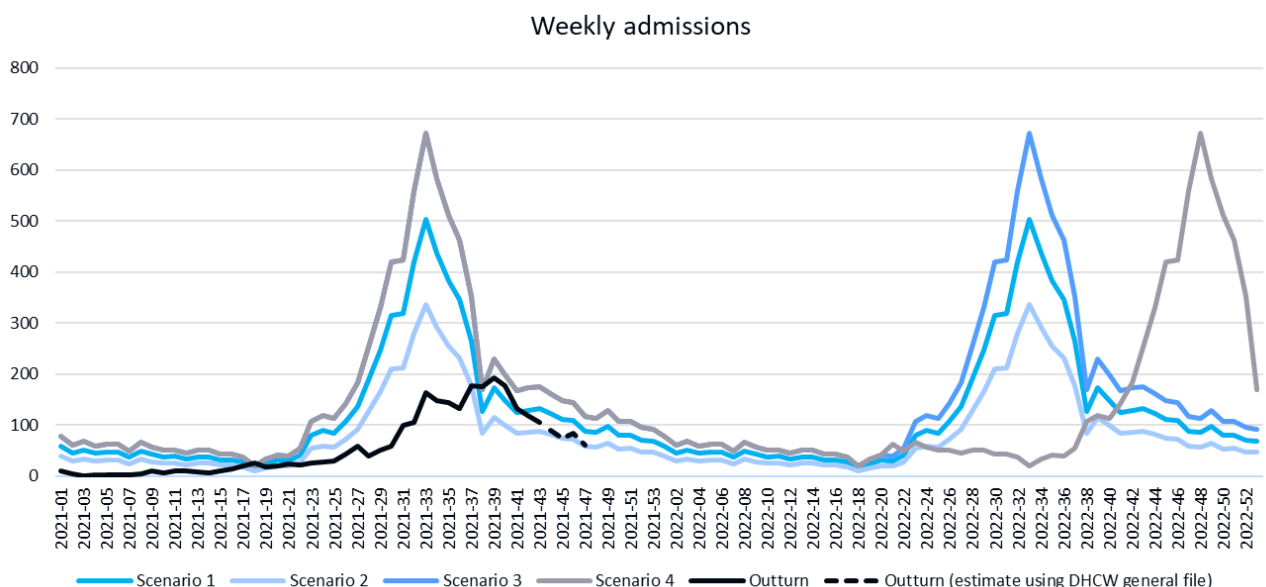
In Wales we modelled 4 scenarios for pressures around paediatric bronchiolitis which is mainly caused by RSV. These were:

1. An earlier outbreak with 50% increase in total number of RSV cases / admissions.
2. An early, but normal or quieter than normal, RSV season (particularly if no pharmaceutical Interventions are maintained).
3. An earlier, larger outbreak with 100% increase in total number of RSV cases / admissions.
4. As scenario 3, but with the 2022 peak returned to normal timing

It had been thought that the RSV season had started early, so scenarios 1-3 modelled both the 2021 and 2022 seasons start 15 weeks early. Scenario 4 is modelled as if the 2022 season returns to normal timing.

The modelled scenarios are shown with outturn² overlaid. The RSV season usually starts in September and peaks in November-December (usually peaks between 22nd November and 2nd December). The recent peak which occurred in September 2021 appears to have passed. There is still concern that a proportion of the population are still susceptible (medium confidence).

Figure 6: Comparison of (weekly) RSV hospital admissions scenarios for Wales, based on previous hospital data with outturn overlaid



In this context it is worth quoting England’s Respiratory DataMart System ([Report w2](#)) “(RSV) positivity remained low at 2.2% in week 1” of 2022 and to note Figure 16 in this report showing DataMart’s peak in positivity for RSV in August (at

² outturn means actuals for the solid black line but a projection of probable actuals using some related data for the dashed black line

over 15%) declined continuously to reach that low.

3. Conclusion

Previously, there was concern that an earlier and larger than normal flu season may occur. This was modelled in the [winter modelling paper](#) published in September 2021. This did not occur by the end of January 2022 (a late surge is still possible but becoming less likely over time). If a late surge does occur, it may co-occur with COVID-19 related pressure on the NHS, and cause diagnostic uncertainty and increased pressure due to overlapping systems. If a late wave of respiratory admissions were to occur, tracking against surveillance data should alert us rapidly.

The most recent RSV season is thought to have passed with the outturn of a lower peak than the previous scenarios published in the [winter modelling paper](#) estimated. This may lead to a return peak next year being higher.

COVID-19 is of more concern currently with hospital admissions due to COVID-19 being higher than for other respiratory illnesses. High rates of COVID-19 vaccination uptake across the population have suppressed the pandemic in its delta variant but the omicron variant surged due to inherent transmissibility and vaccine escape.

Annex A: Definitions

The medical diagnoses and associated codes described in this paper are taken from the DHCW datafile. The definitions in the datafile are taken from the ICD10³.

Respiratory infection:

Respiratory tract infections (RTIs) can affect the sinuses, throat, airways or lungs. Most RTIs get better without treatment, but sometimes you may need to see your GP. Symptoms of an RTI include:

- a cough - you may bring up mucus (phlegm)
- sneezing
- a stuffy or runny nose
- a sore throat
- headaches
- muscle aches
- breathlessness, tight chest or wheezing
- a high temperature (fever)
- feeling generally unwell

RSV: Respiratory syncytial virus

A common respiratory virus that usually causes mild, cold-like symptoms. Most people recover in a week or two, but RSV can be serious, especially for infants and older adults.

Conditions (most common) that come under diagnosis subgroups

J00 to J06	Common cold; Sinusitis; Pharyngitis; Tonsillitis; Laryngitis
J09 to J18	Influenza; Pneumonia; Bronchitis
J20 to J22	Acute bronchitis; Acute lower respiratory infection
J30 to J39	Rhinitis; Chronic sinusitis; Nasal polyp; Nasal abscess; Nasal cyst; Chronic diseases of tonsils and adenoids; Chronic laryngitis; Diseases of vocal cords and larynx; Diseases of the upper respiratory tract
J40 to J47	Laryngotracheobronchitis; Chronic bronchitis; Emphysema; Chronic obstructive pulmonary disease; Asthma; Bronchiectasis

³ [International Statistical Classification of Diseases and Related Health Problems 10th Revision](#)