Tues 02 November 2021

Modelling the COVID-19 epidemic; the Reproduction Number and other indicators

Current estimate of Rt (new positive tests): 0.90 – 1.00 (7 days previous 0.95-1.05)

Current estimate of Rt (hospital admissions): 1.00 – 1.10 7 days previous 0.90-1.10)

Average number of new positive tests per day last 7 days: 1185 (7 days previous 1273)

7 day incidence based on new positive tests: 436 / 100k (7 days previous 469)

14 day incidence based on new positive tests: 907 / 100k (7 days previous 945)

7 day average of total positive individuals (pillar 1/2): 7.9% (7 days previous 7.5%)

7 day daily average tests completed: 15,435 (7 days previous 16,970)

Number of new positive tests in over 60s in last 7 days: 1190 (8 days previous 1208)

Proportion of total positive tests occurring in over 60s: 14.5% (9 days previous 13.6%)

COVID-19 +ve hospital admission in last week: 210 (7 days previous 206)

Number of COVID-19 inpatients: 345 (7 days previous 326)

COVID-19 +ve ICU patients: 36 (7 days previous 33)

The number of new positive cases has fallen in the last week while the percentage of positive tests has risen slightly. The fall in case numbers is primarily attributed to a fall in detected cases in 0-15s as a results of decreased testing during half term. However, there has been a significant rise in cases in the over 40s, which is a matter of concern; this may reflect waning immunity or altered behaviours and it will be necessary to watch trends closely. There has been a rise in hospital COVID inpatients of around 6% in the last week. Rt for cases is slightly below 1 and for admissions in above 1. Community transmission is roughly constant at a high level, but may be increasing for over 40s which would be expected to feed through into increased hospital pressures. ICU occupancy remains steady at between 30- 40.

Modelling suggests a largely plateaued picture at a high level for the next four weeks, with the possibility of modest falls or rises in both cases and hospital pressures. For cases, we have fallen below the central scenario in the last week

as a result of a decrease in testing associated with school half term; this is likely to be a temporary phenomenon. For hospital inpatients we are currently between the central and more severe scenarios.

A high level of adherence to continued mitigations, including use of face coverings, work from home and proof of low transmission risk, will be essential if Rt is to be maintained at less than 1.

The delta variant in NI accounts for the vast majority of cases and is the dominant variant. We expect variant AY 4.2 to increase in importance due to its modest transmission advantage (10 – 15%), but the speed at which this will occur remains uncertain. There is no evidence that other significant variants are established in NI at present.

During the most recent period of the ONS Survey (week up to 23rd October), it was estimated that 23,900 people had COVID-19 (95% credible interval: 17,000 to 32,300). This equates to 1.31% (95% credible interval: 0.93% to 1.76%) of the population in Northern Ireland or around 1 in 75 people (95% credible interval: 1 in 55 to 1 in 110). This is compared to the other countries of the UK below.

Tues 02 November 2021

ONS COVID-19 Infection Survey

Week up to 23rd Oct

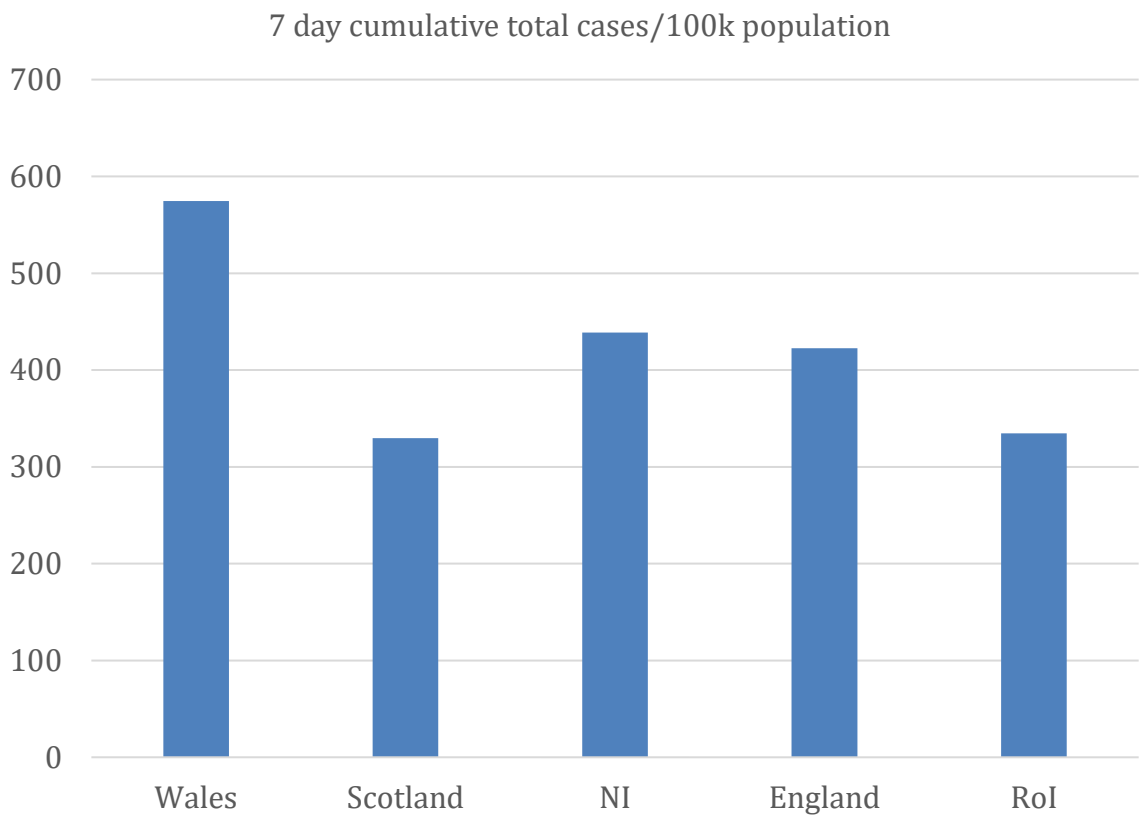
Country	Estimated average % of the population that had COVID-19	95% credible interval		Estimated average number of people testing positive for COVID-19	95% credible interval		Estimated average ratio of the population that had COVID-19	95% credible interval	
		Lower	Upper		Lower	Upper		Lower	Upper
England	2.02	1.91	2.13	1,102,800	1,043,900	1,161,200	1 in 50	1 in 50	1 in 45
Wales	2.56	2.12	3.04	77,800	64,300	92,400	1 in 40	1 in 45	1 in 35
Northern Ireland	1.31	0.93	1.76	23,900	17,000	32,300	1 in 75	1 in 110	1 in 55
Scotland	1.36	1.12	1.62	71,500	58,900	85,200	1 in 75	1 in 90	1 in 60

Source: Office for National Statistics – Coronavirus (COVID-19) Infection Survey

NI, UK and Republic of Ireland comparison

Wales has the highest reported incidence across the common travel area but cases have started to decline, based on dashboard figures published by respective Governments. There have been decreases in incidence across all UK nations in the last week. RoI incidence has increased in the last week. COVID testing is significantly lower in RoI than NI, and testing strategy is different, so a direct comparison with NI and other parts of the UK may be misleading.

Tues 02 November 2021



Regional variation in cases –

Variation in cases in LGDs is shown below. Cases are down in most LGDs for the reasons discussed above.

Tues 02 November 2021

7-day total cases / 100,000 population by LGD

25th Oct	26th Oct	27th Oct	28th Oct	29th Oct	30th Oct	31st Oct	1st Nov	LGD
554	561	353	570	571	564	557	558	Antrim and Newtownabbey
445	437	442	458	474	483	476	484	Ards and North Down
546	530	502	499	498	495	487	457	Armagh City, Banbridge and Craigavon
422	408	401	396	402	401	394	376	Belfast
460	456	423	438	445	425	421	415	Causeway Coast and Glens
317	309	488	299	313	323	307	310	Derry City and Strabane
552	525	496	498	504	493	491	486	Fermanagh and Omagh
513	504	484	496	499	496	490	462	Lisburn and Castlereagh
396	391	371	378	378	377	373	385	Mid and East Antrim
364	373	376	373	380	384	382	391	Mid Ulster
387	370	355	359	371	370	379	379	Newry, Mourne and Down

Determining the value of Rt

The most common approach to determining Rt during an epidemic is to use mathematical modelling, in particular a compartmental model using a SIR (susceptible-infectious-recovered) approach or a variation of it. Dozens of such models have been published and are in use throughout the world; there is no single standard model which everyone uses.

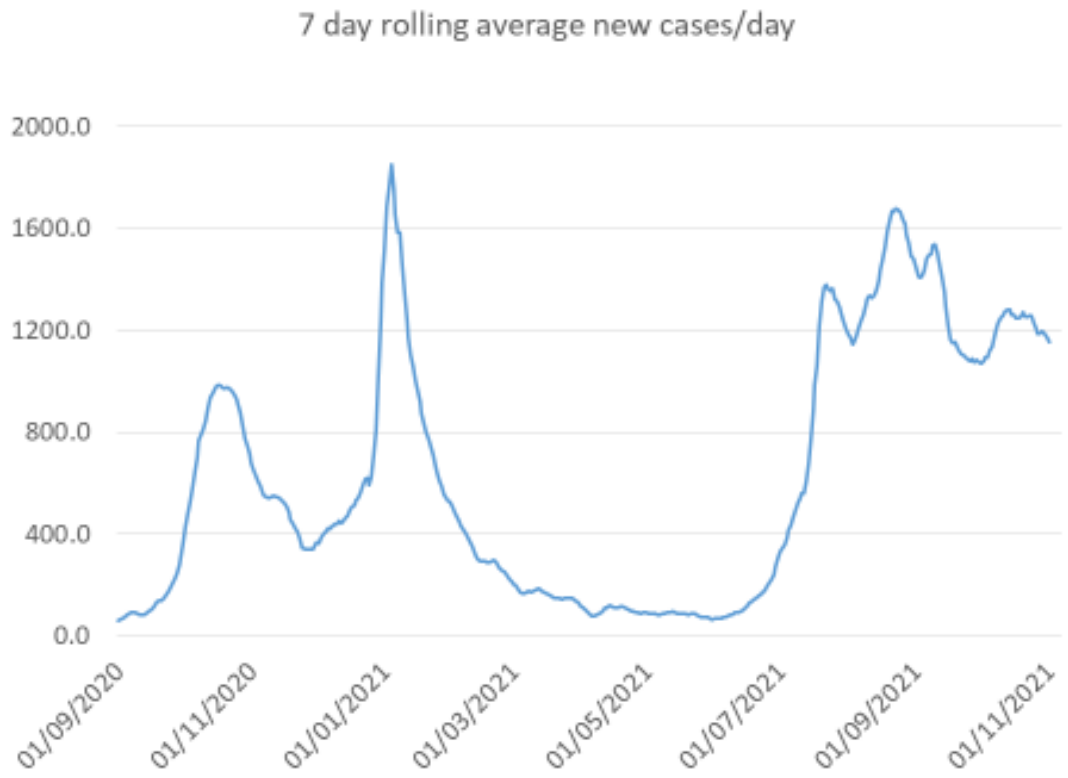
In addition to the impact of the mathematical model used, the calculated value of Rt is also influenced by the choice of input variable. Rt calculated for new COVID-19 cases will not be the same as Rt calculated for hospital admissions, or ICU occupancy, or deaths. There may be a significant lag (2-3 weeks) before a fall in Rt is apparent depending on the input variable(s) used.

Tues 02 November 2021

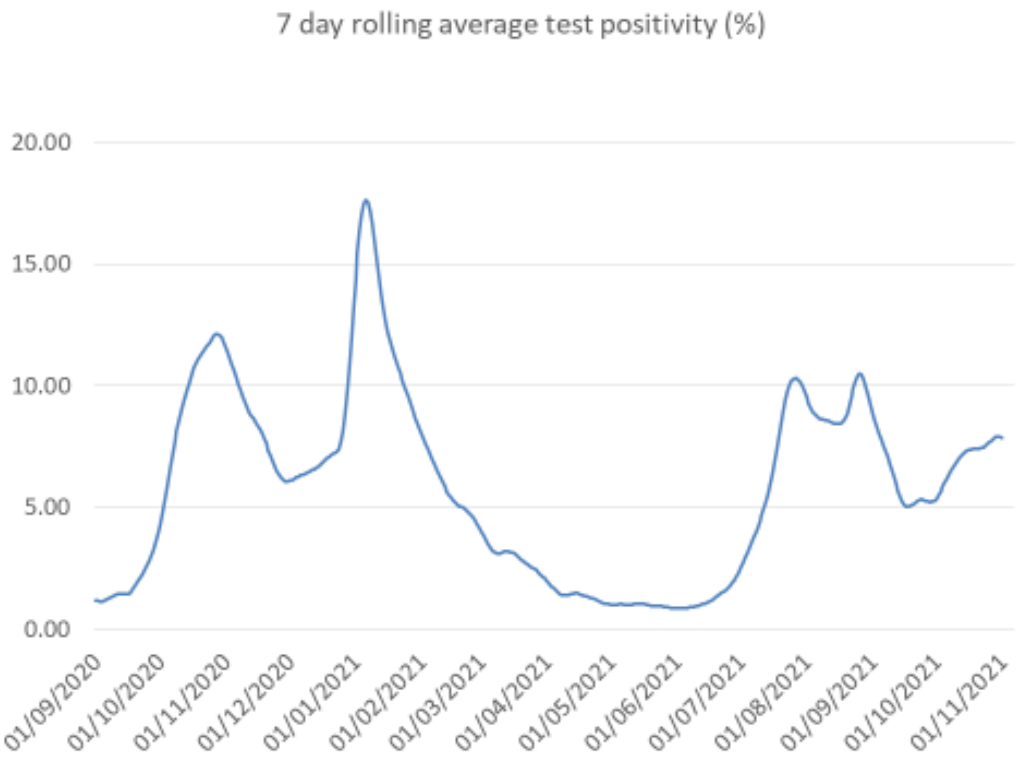
The modelling group determines Rt each day using a bespoke Northern Ireland SIR model. As its primary input the group uses hospital in-patient admissions with community-acquired COVID-19, but also uses a range of other inputs. We therefore have several different values for Rt each day, each of which has a midpoint value and a lower and upper boundary (95% confidence intervals). In addition a number of academic groups, both in the UK and ROI, model the COVID-19 epidemic and we have access to their estimates of Rt for Northern Ireland. Rt can also be determined based on a contact matrix survey, and this approach may be more reliable when levels of community transmission are very low.

Trends for Northern Ireland

The value of Rt for cases (0.90 – 1.00) is a little below 1 and for admissions (1.00 – 1.10) is a little above 1. The graphs below show trends in cases and test positivity.

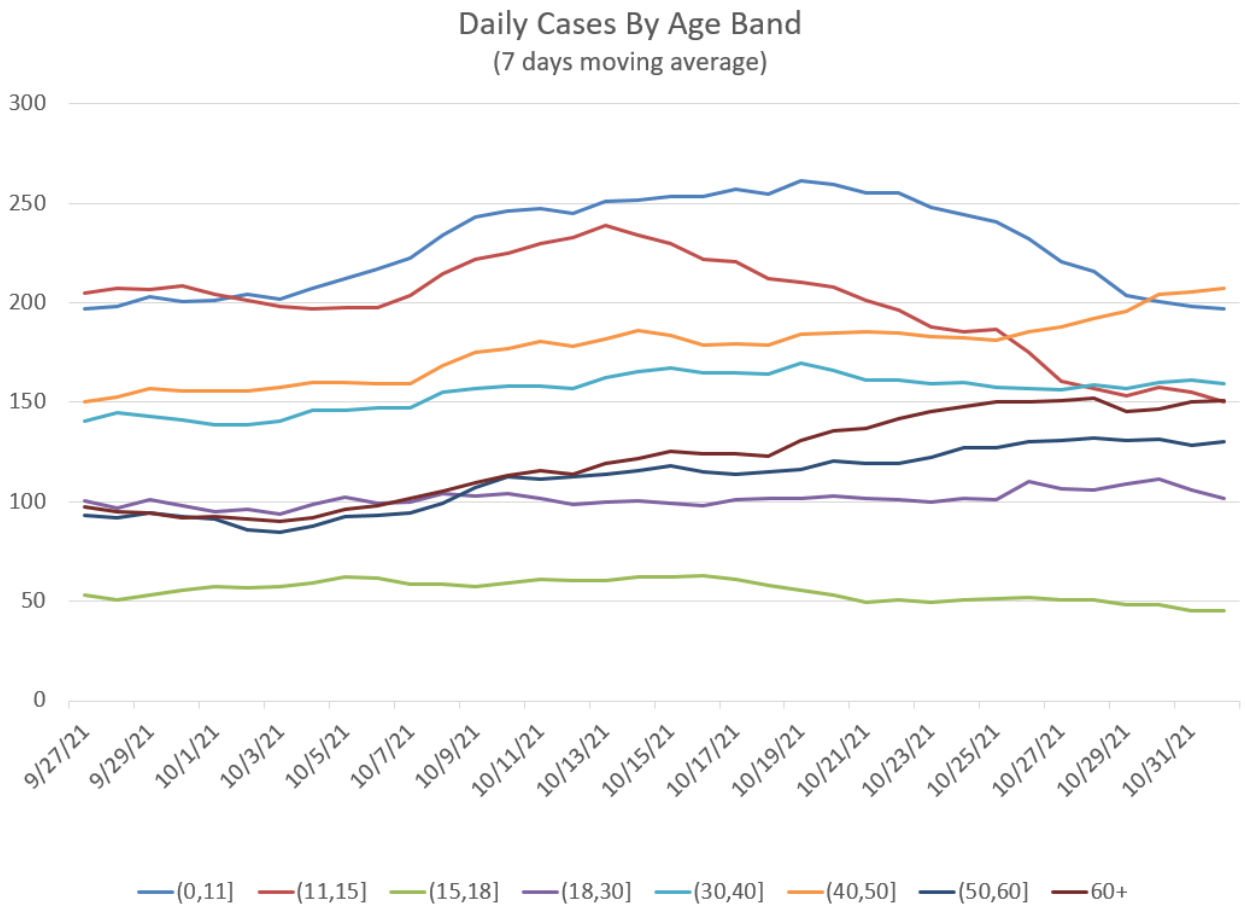


Tues 02 November 2021



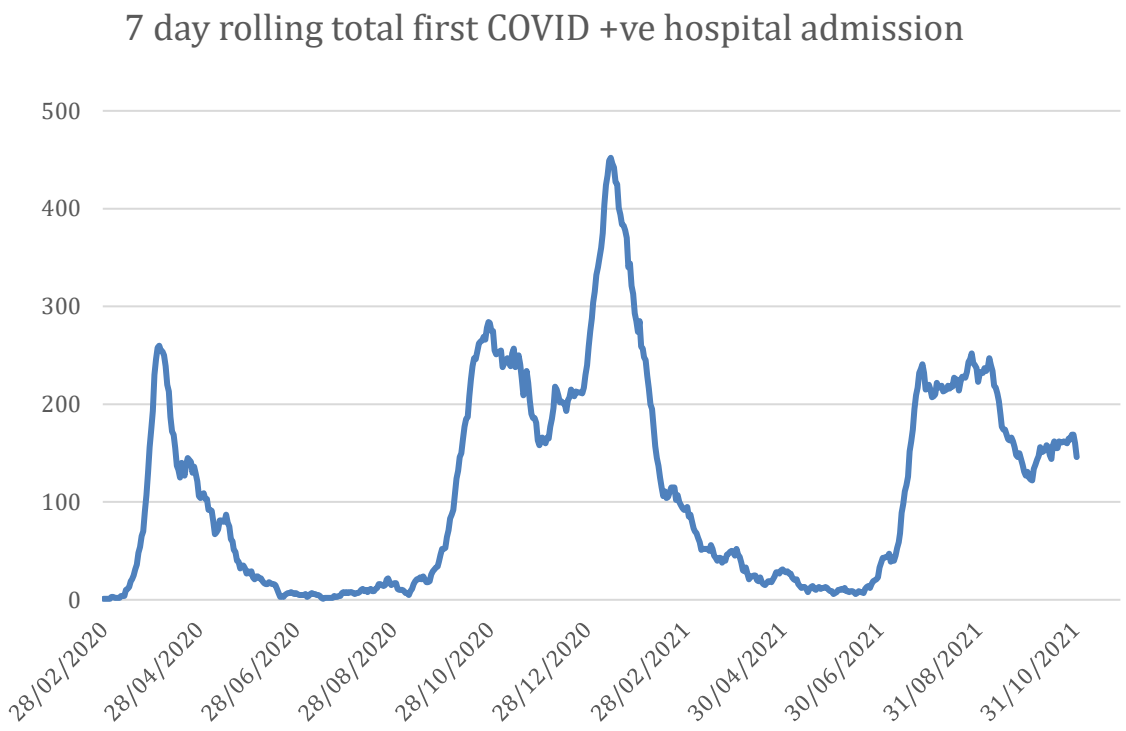
Cases are highest in 40-50 year olds, having increased substantially in the last week. There are also increases in the 50-60 years and over 60s age-groups. The 0-15 year age-group dropped this week. The data this week will most likely be effected by the school mid-term break and should be interpreted cautiously in this context.

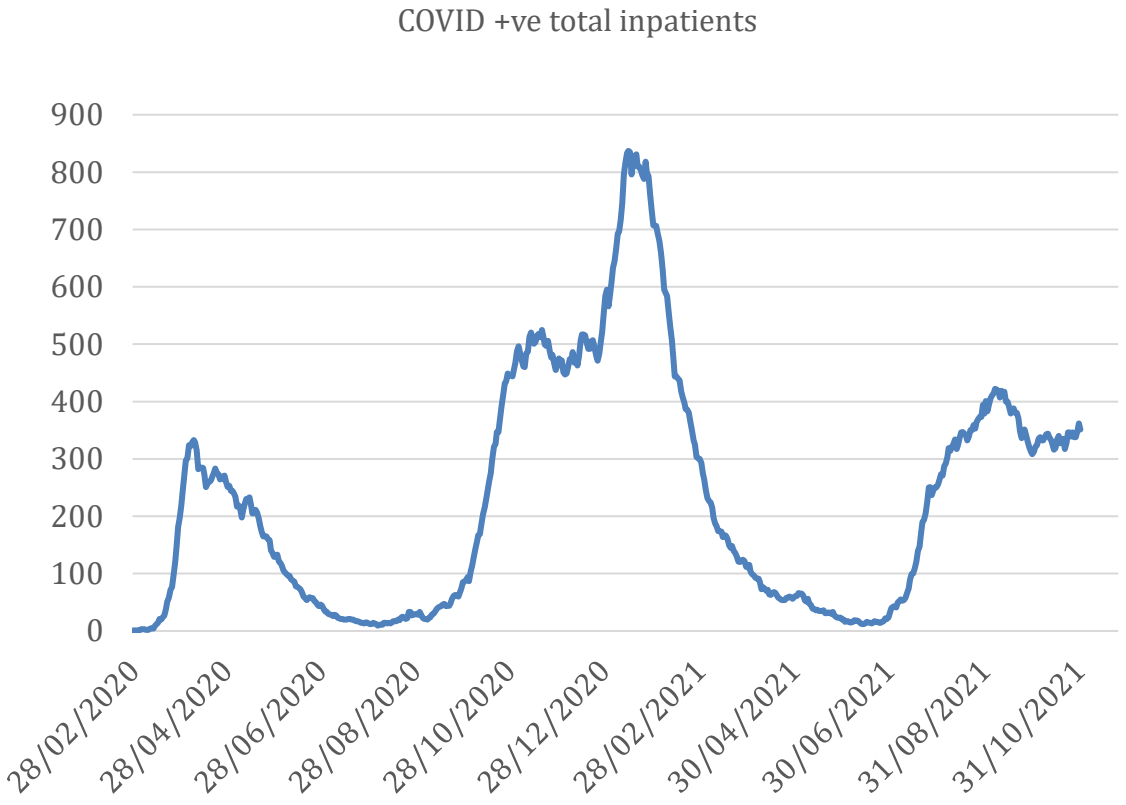
Tues 02 November 2021



The following graphs show hospital admissions of COVID positive patients over a rolling 7-day period and the number of hospital inpatients. Both are tending to rise slowly, and there has been an increase in COVID hospital inpatients of 6% in the last week.

Tues 02 November 2021





Tues 02 November 2021

ICU occupancy is approximately constant; deaths fluctuate but overall numbers remain relatively small.