

Tues 28<sup>th</sup> September 2021

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

**Current estimate of Rt (new positive tests): 0.80 – 1.00 (7 days previous 0.70-0.90)**

**Current estimate of Rt (hospital admissions): 0.75 - 0.95 (7 days previous 0.70-0.90)**

**Average number of new positive tests per day last 7 days: 1114 (7 days previous 1176)**

**7 day incidence based on new positive tests: 410 / 100k (7 days previous 433)**

**14 day incidence based on new positive tests: 844 / 100k (7 days previous 1001)**

**7 day average of total positive individuals (pillar 1/2): 5.4% (7 days previous 5.1%)**

**7 day daily average tests completed: 21,423 (7 days previous 21,610)**

**Number of new positive tests in over 60s in last 7 days: 838 (8 days previous 904)**

**Proportion of total positive tests occurring in over 60s: 10.8% (9 days previous 10.9%)**

**COVID-19 +ve hospital admission in last week: 217 (7 days previous 227)**

**Number of COVID-19 inpatients: 351 (7 days previous 377)**

**COVID-19 +ve ICU patients: 29 (7 days previous 33)**

**Both positive cases and testing have declined but at a slower rate than the previous week, with testing numbers starting to stabilize after the changes in testing strategy. The percentage of positive tests remains stable. Cases have declined in most age groups, with a slight rise in the 11-15 year age-group. Hospital admissions, inpatient occupancy and ICU occupancy continue to decrease slowly. The conversion rate of cases to hospital admissions with a lag of 8 days has fallen to 1.6%. Deaths remain relatively constant.**

**In terms of modelling, both cases and occupancy are closest to the less severe scenario; however, for cases this will be partly as a result of change in testing strategy as discussed above. Universities returned last week and any impact will not be apparent until early October.**

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**The delta variant in NI accounts for over 95% of all cases and is the dominant variant. The remaining cases are almost all alpha variant. There is no evidence that other significant variants are established in NI at present.**

During the most recent period of the ONS Survey (12<sup>th</sup> to 18<sup>th</sup> September), it was estimated that 30,300 people had COVID-19 (95% credible interval: 22,800 to 39,200). This equates to 1.65% (95% credible interval: 1.24% to 2.14%) of the population in Northern Ireland or around 1 in 60 people (95% credible interval: 1 in 45 to 1 in 80). This is compared to the other countries of the UK below.

### ONS COVID-19 Infection Survey

Week up to 18th Sept

Country	Estimated average % of the population that had COVID-19		Estimated average number of people testing positive for COVID-19			Estimated average ratio of the population that had COVID-19			
	95% credible interval	95% credible interval	95% credible interval	95% credible interval	95% credible interval	95% credible interval			
	Lower	Upper	Lower	Upper	Lower	Upper			
England	1.14	1.06	1.22	620,100	577,100	663,900	1 in 90	1 in 95	1 in 80
Wales	1.67	1.31	2.06	50,700	39,900	62,700	1 in 60	1 in 75	1 in 50
Northern Ireland	1.65	1.24	2.14	30,300	22,800	39,200	1 in 60	1 in 80	1 in 45
Scotland	2.28	1.92	2.69	120,200	101,000	141,500	1 in 45	1 in 50	1 in 35

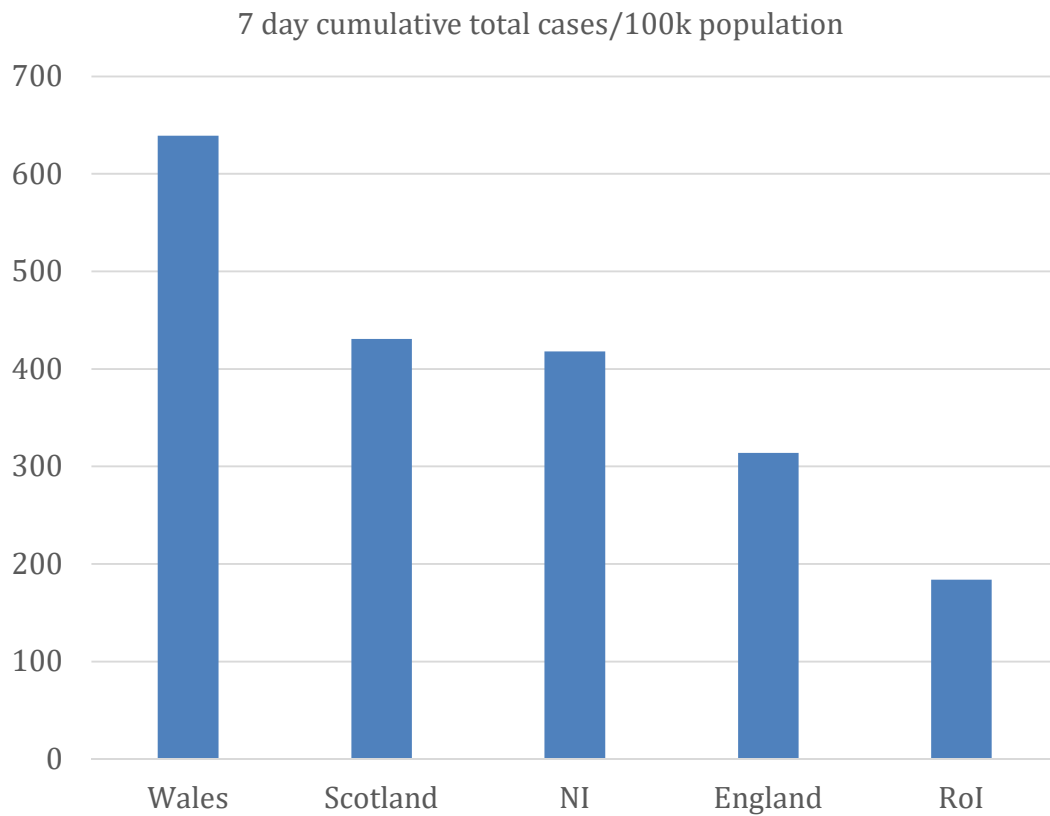
Source: Office for National Statistics – Coronavirus (COVID-19) Infection Survey

### NI, UK and Republic of Ireland comparison

Wales has the highest reported incidence across the common travel area, based on dashboard figures published by respective Governments. There has been a slight rise in incidence in England, while the trajectory of cases in the other nations is downwards.

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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.



### **Regional variation in cases**

Incidence per LGD over the last week is shown in the table below, and at present is reasonably uniform across NI. LGDs in the East of NI are tending to increase at present, but most LGDs are declining slowly.

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

20th Sept	21st Sept	22nd Sept	23rd Sept	24th Sept	25th Sept	26th Sept	27th Sept	LGD
385	374	399	404	410	427	429	433	Antrim and Newtownabbey
322	327	336	340	374	393	403	392	Ards and North Down
457	453	444	433	428	428	422	408	Armagh City, Banbridge and Craigavon
402	377	374	363	373	378	380	375	Belfast
401	392	390	394	415	449	459	436	Causeway Coast and Glens
449	440	454	435	418	398	401	374	Derry City and Strabane
509	480	465	442	428	422	411	393	Fermanagh and Omagh
475	457	433	423	425	429	423	409	Lisburn and Castlereagh
356	349	360	368	381	376	379	363	Mid and East Antrim
502	500	497	505	525	525	510	515	Mid Ulster
358	335	317	320	301	317	295	284	Newry, Mourne and Down

### Determining the value of $R_t$

The most common approach to determining  $R_t$  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.

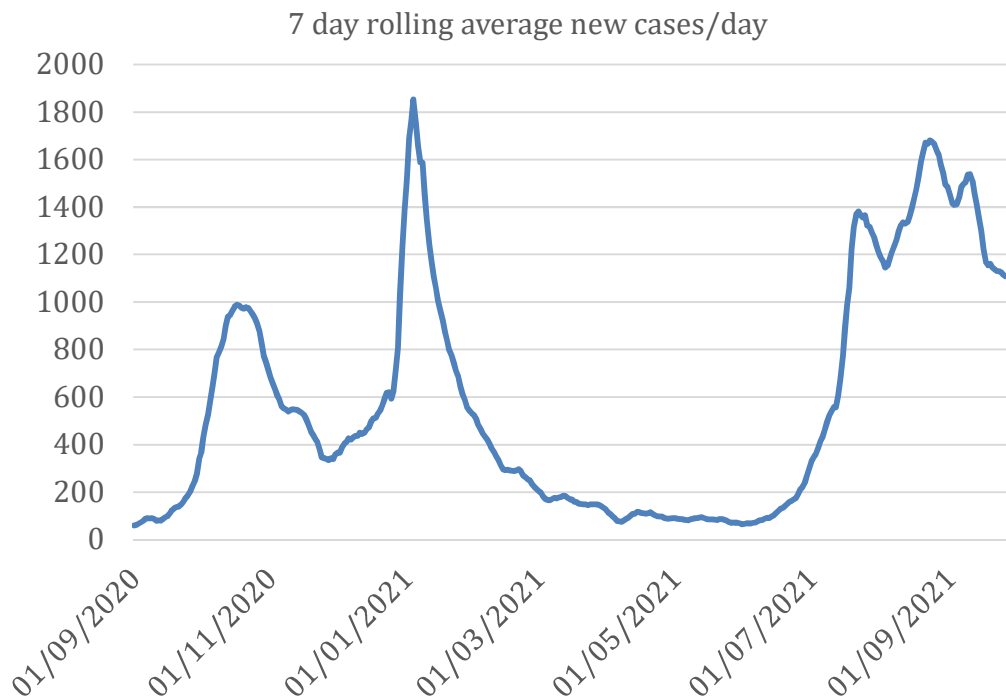
In addition to the impact of the mathematical model used, the calculated value of  $R_t$  is also influenced by the choice of input variable.  $R_t$  calculated for new COVID-19 cases will not be the same as  $R_t$  calculated for hospital admissions, or ICU occupancy, or deaths. There may be a significant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

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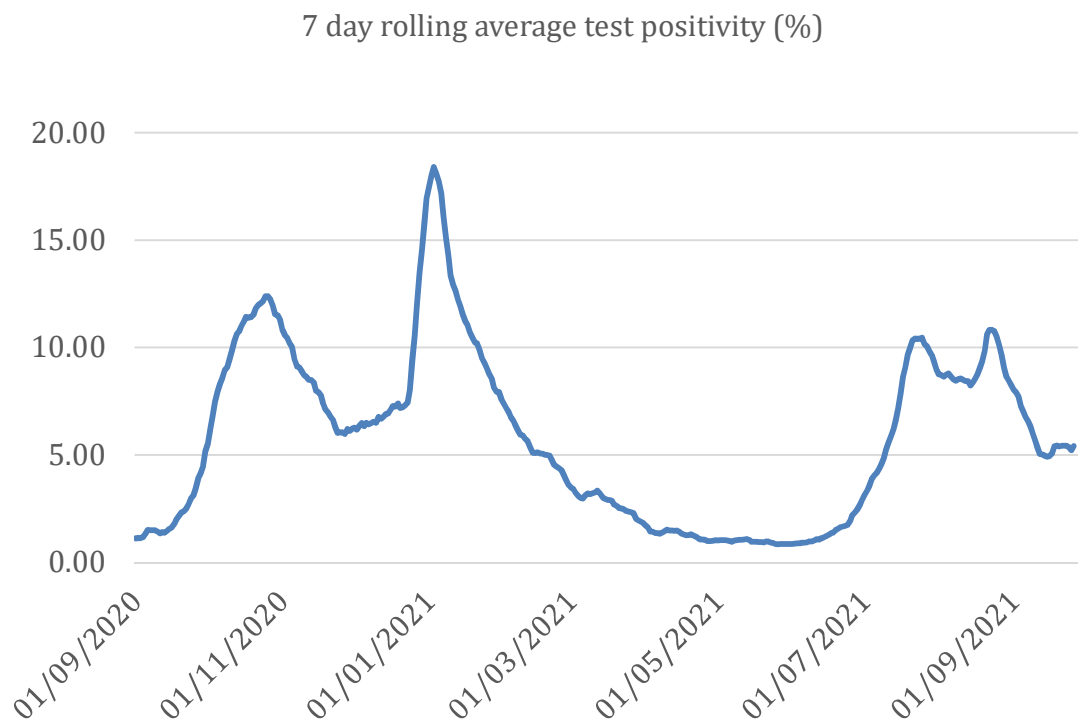
The modelling group determines  $R_t$  each day using a bespoke Northern Ireland SIR model. As its primary input the group uses hospital in-patient admissions with community-acquired COVID-19, but also uses a range of other inputs. We therefore have several different values for  $R_t$  each day, each 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  $R_t$  for Northern Ireland.  $R_t$  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  $R_t$  for cases and admissions is below 1, ranging from 0.8-1.0 for cases and 0.75-0.95 for admissions.

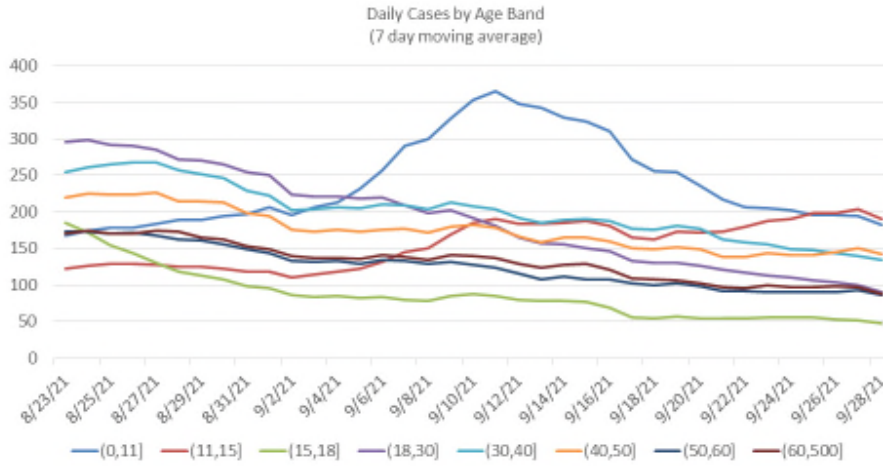


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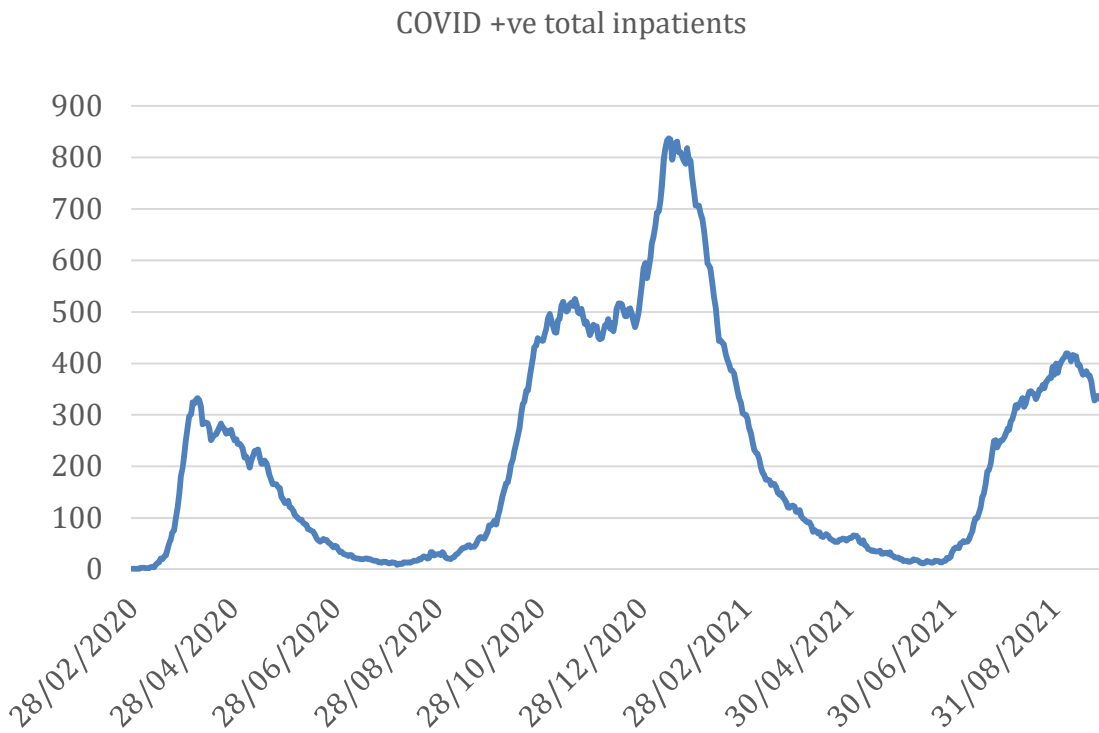
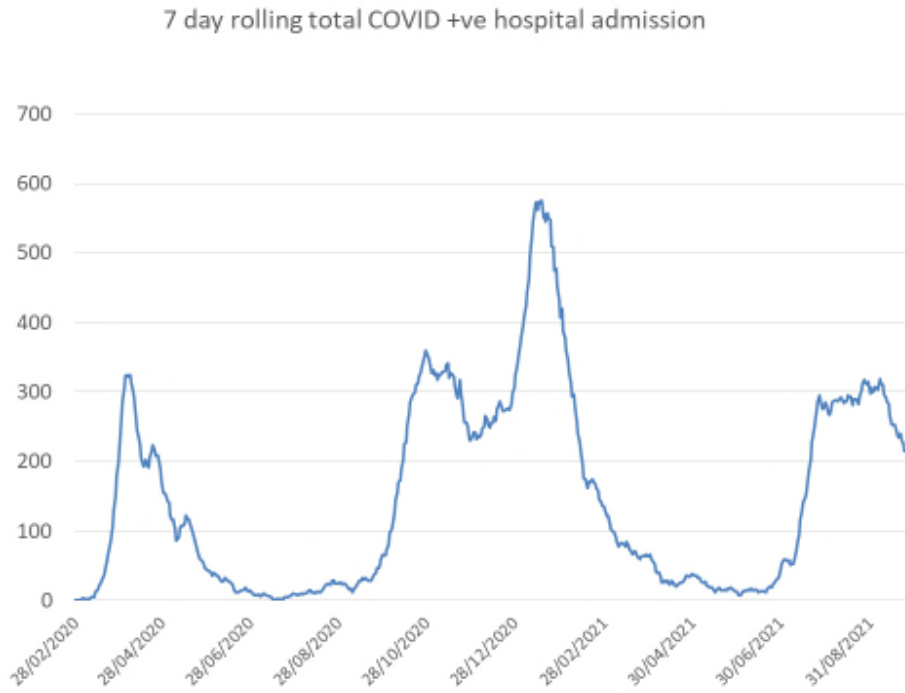
Cases are falling in most age groups with the exception of the 11-15 year age-group which increased slightly.

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The following graphs show hospital admissions of COVID positive patients over a rolling 7-day period and the number of hospital inpatients. Both admissions and inpatients are falling slowly.

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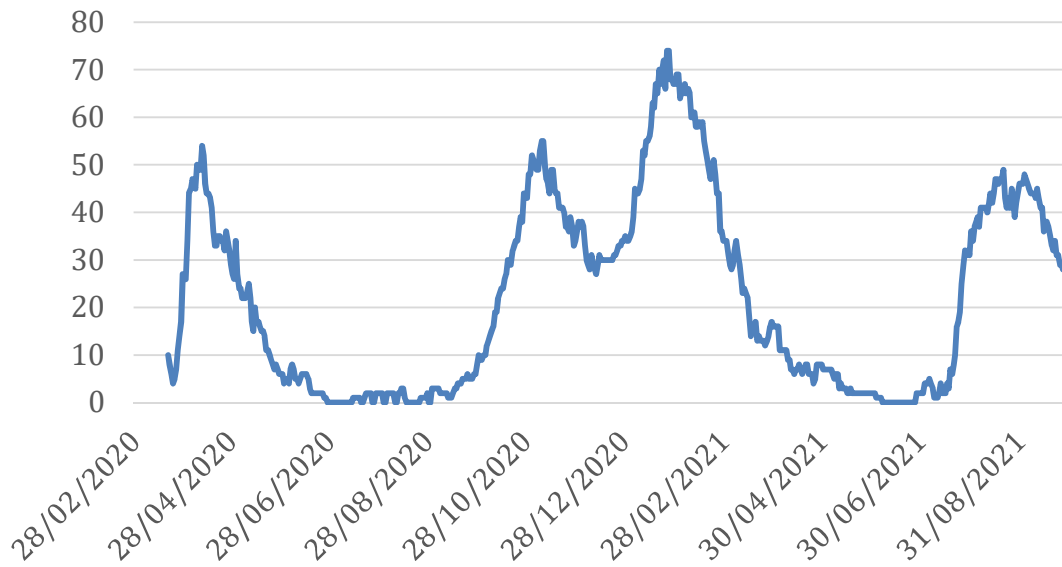


ICU occupancy is decreasing while deaths in hospital are relatively steady.



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COVID +ve patients in ICU



Covid-19 7 day total hospital deaths



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