Tues 25th May 2021

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

Current estimate of Rt (new positive tests): 0.80 – 1.10 (7 days previous 0.80 – 1.10)

Current estimate of Rt (hospital admissions): numbers too low for reliable estimate

Average number of new positive tests per day last 7 days: 91 (7 days previous 90)

7 day incidence based on new positive tests: 34 / 100k (7 days previous 33)

14 day incidence based on new positive tests: 67 / 100k (7 days previous 66)

7 day average of total positive individuals (pillar 1 and 2): 1.0% (7 days previous 1.0%)

7 day daily average tests completed: 10,159 (7 days previous 10,087)

Number of new positive tests in over 60s in last 7 days: 30 (7 days previous 41)

Proportion of total positive tests occurring in over 60s: 4.9% (7 days previous 6.6%)

First COVID-19 +ve hospital admission in last week: 12 (7 days previous 11)

Number of community acquired COVID-19 inpatients: 33 (7 days previous 34)

COVID-19 +ve ICU patients: 2 (6 days previous 2)

The number of new positive cases and percentage of positive tests have been steady over the past week. Derry and Strabane remains at a higher level than other LGDs, though Mid-Ulster and Newry, Mourne and Down are now also over 50/100k/7days. Rt for cases is stable at around 1. Hospital admissions, inpatient numbers, ICU occupancy and deaths remain at a very low level. It will take approximately 3 weeks to see the effect of relaxations of 24th May.

Results from several different sources of genomic data suggest that the B.1.1.7 viral lineage that is prevalent elsewhere in the UK and Ireland is common in Northern Ireland (>80% of cases). This means that under conditions of increased inter-personal contact in future, the epidemic will grow more quickly than previously. A number of cases of the B.1.617.2 variant have been detected work is ongoing to understand the extent of transmission or if cases have been contained. There is no evidence of sustained transmission of B1.617.2 in the community at present, unlike other parts of the UK, although it is likely that further introductions as a result of increased CTA and

international travel will result in it becoming the dominant form in the future, with adverse consequences for the course of the epidemic. There is no evidence that other significant variants have become established in NI at present.

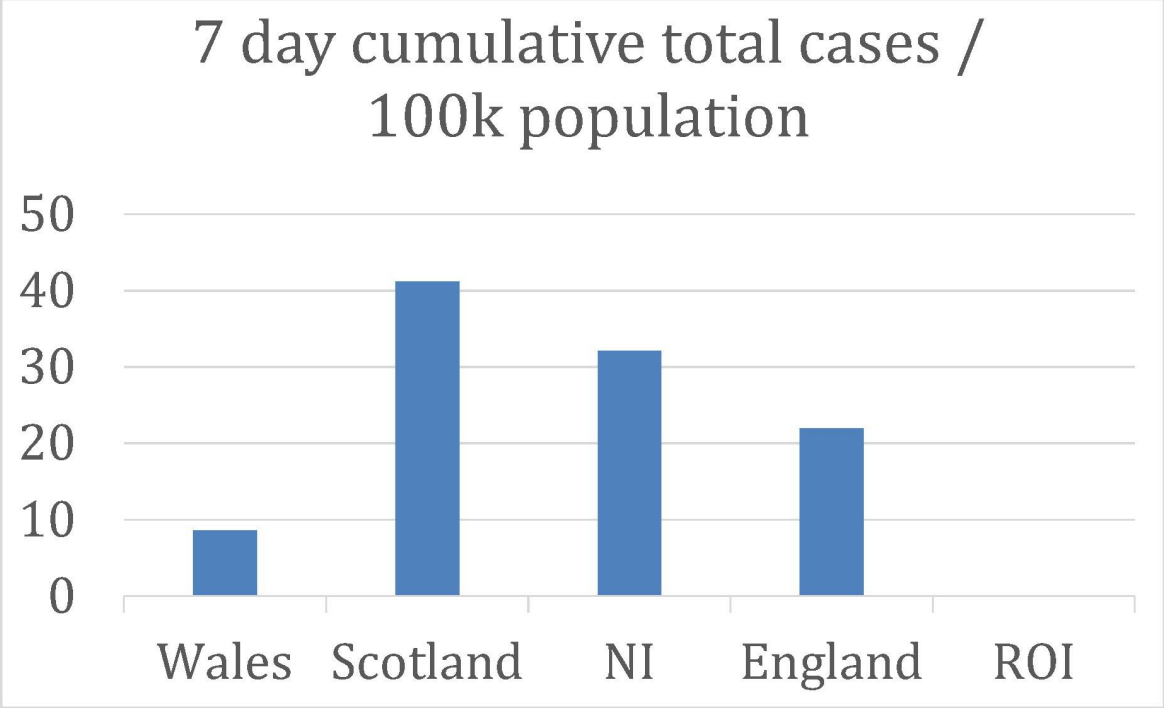
During the most recent week of the ONS Survey (week ending 15th May), it was estimated that 1,200 people had COVID-19 (95% credible interval: 300 to 2,900). This equates to 0.06% (95% credible interval: 0.01% to 0.16%) of the population in Northern Ireland or around 1 in 1,550 people (95% credible interval: 1 in 630 to 1 in 6.810). This is compared to the other countries of the UK below.

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	0.09%	0.07%	0.11%	49,000	38,800	60,300	1 in 1,110	1 in 1,410	1 in 900
Wales	0.02%	0.00%	0.07%	700	100	2,000	1 in 4,430	1 in 26,110	1 in 1,530
Northern Ireland	0.06%	0.01%	0.16%	1,200	300	2,900	1 in 1,550	1 in 6,810	1 in 630
Scotland	0.05%	0.02%	0.10%	2,700	1,000	5,200	1 in 1,960	1 in 5,160	1 in 1,010

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

NI, UK and Republic of Ireland comparison

In terms of cases reported, NI has a higher incidence than England or Wales, and a lower incidence than Scotland based on dashboard figures published by relevant Governments. Due to IT problems in ROI no figures are available to allow a comparison with NI.



Regional variation in cases

Incidence per LGD is shown over the last week in the table below. Cases in Derry City and Strabane remain higher than in the rest of NI, though are trending downwards. Cases in neighbouring parts of Donegal are at an even higher level. Work is ongoing to understand and address relevant factors. Other areas of concern at present include Mid-Ulster and Newry, Mourne and Down.

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

16th May	17th May	18th May	19th May	20th May	21st May	22nd May	23rd May	LGD
25	27	22	20	21	22	24	20	Antrim and Newtownabbey
6	4	4	4	3	3	3	4	Ards and North Down
24	23	27	28	29	29	30	27	Armagh City, Banbridge and Craigavon
23	24	25	23	23	23	23	22	Belfast
43	42	35	35	31	28	25	22	Causeway Coast and Glens
100	94	88	86	78	76	74	71	Derry City and Strabane
26	27	32	33	37	38	39	40	Fermanagh and Omagh
16	20	25	24	30	32	33	30	Lisburn and Castlereagh
9	7	7	9	12	13	14	16	Mid and East Antrim
50	50	54	55	54	55	57	59	Mid Ulster
39	40	41	38	39	45	52	50	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.

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 is 0.80 – 1.10 for cases and remains unchanged.

The graphs below show that the number of new COVID 19-cases has remained stable in the last week, as has test positivity.

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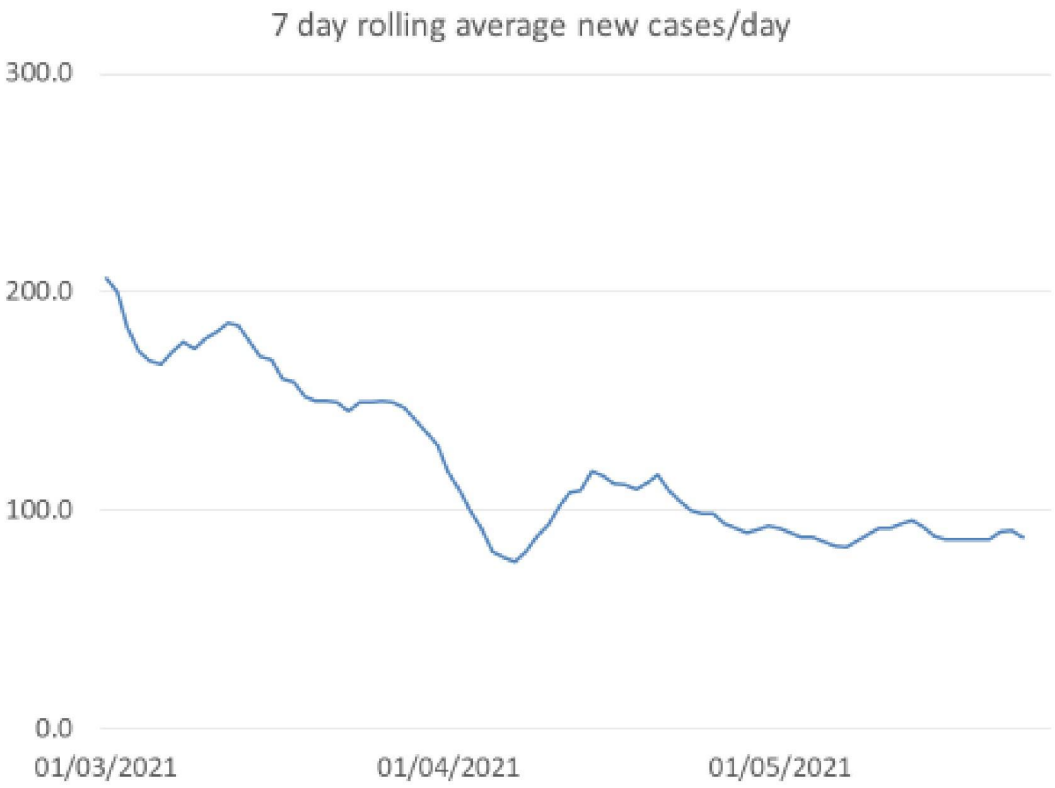

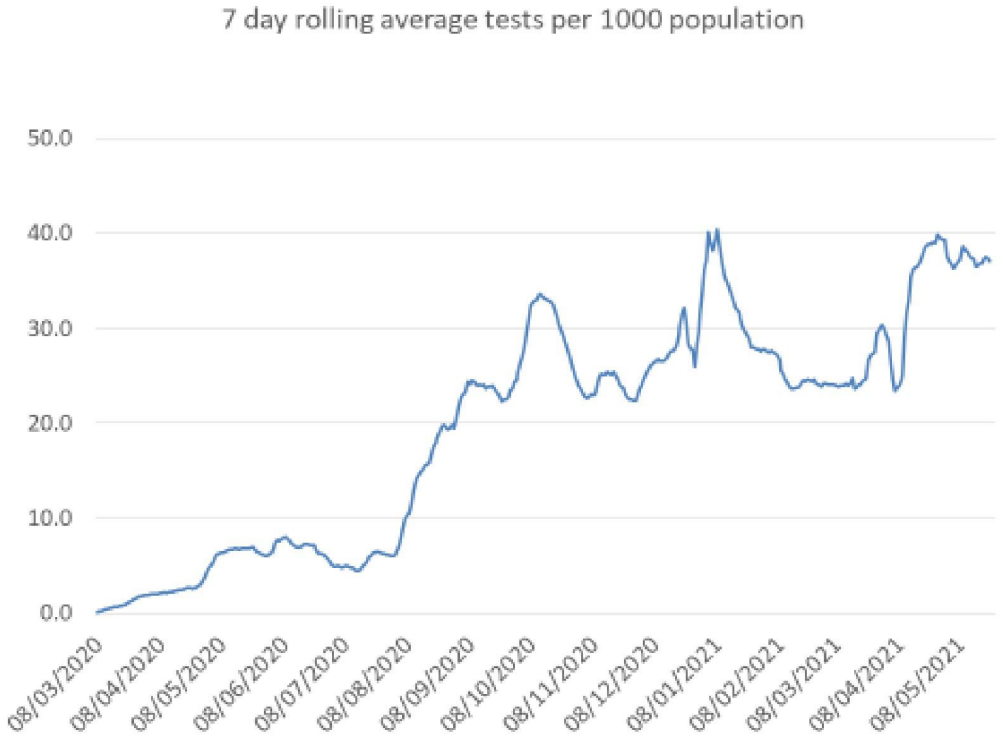

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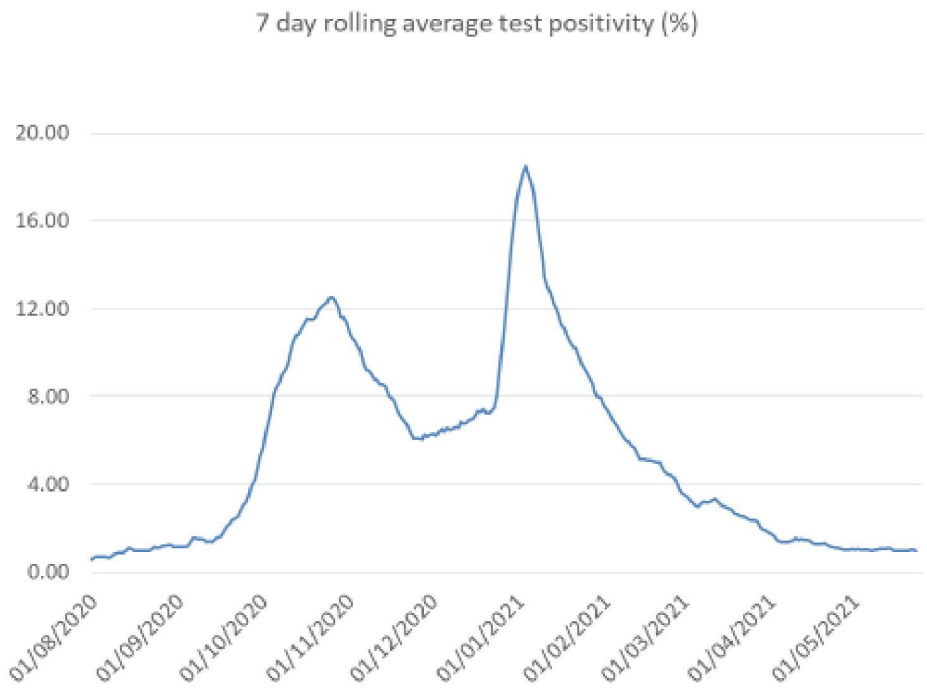

The following graphs show first hospital admission of COVID positive patients over a rolling 7-day period and the number of hospital inpatients, ICU occupancy and deaths. All remain stable at a low level.

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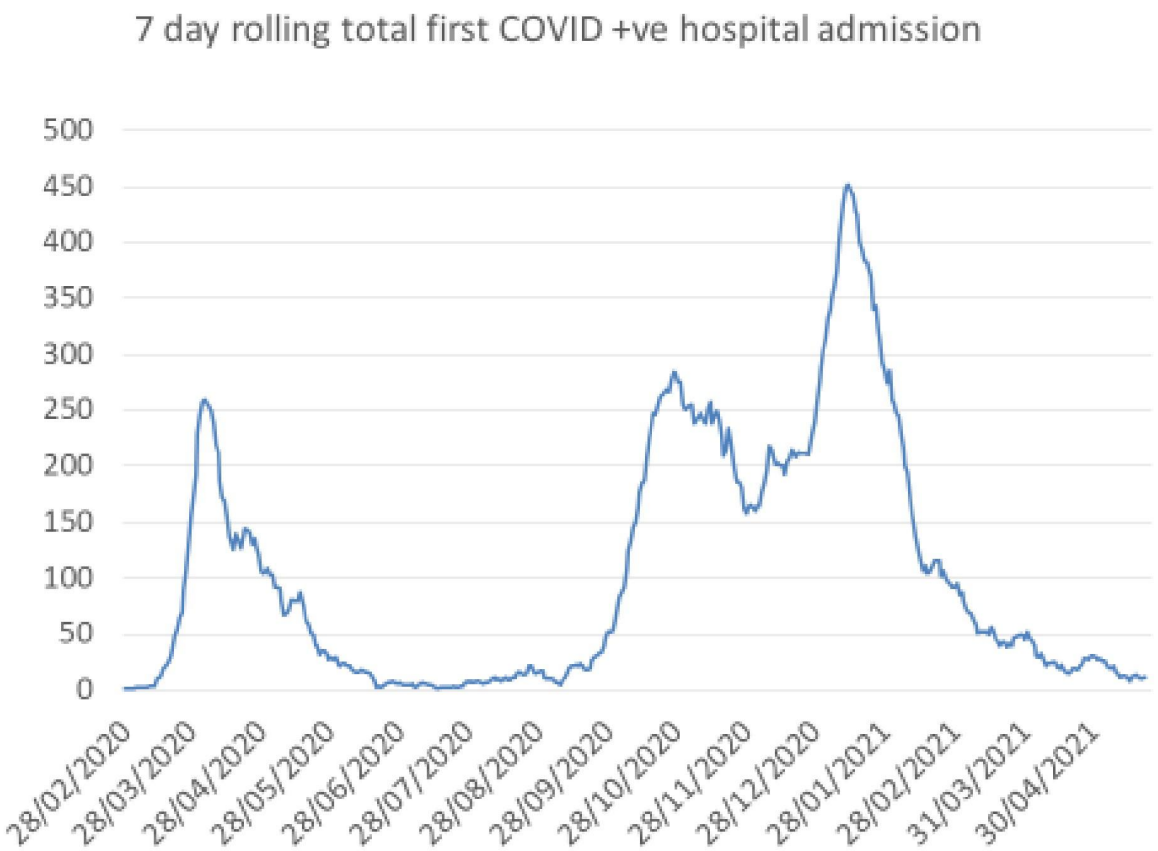

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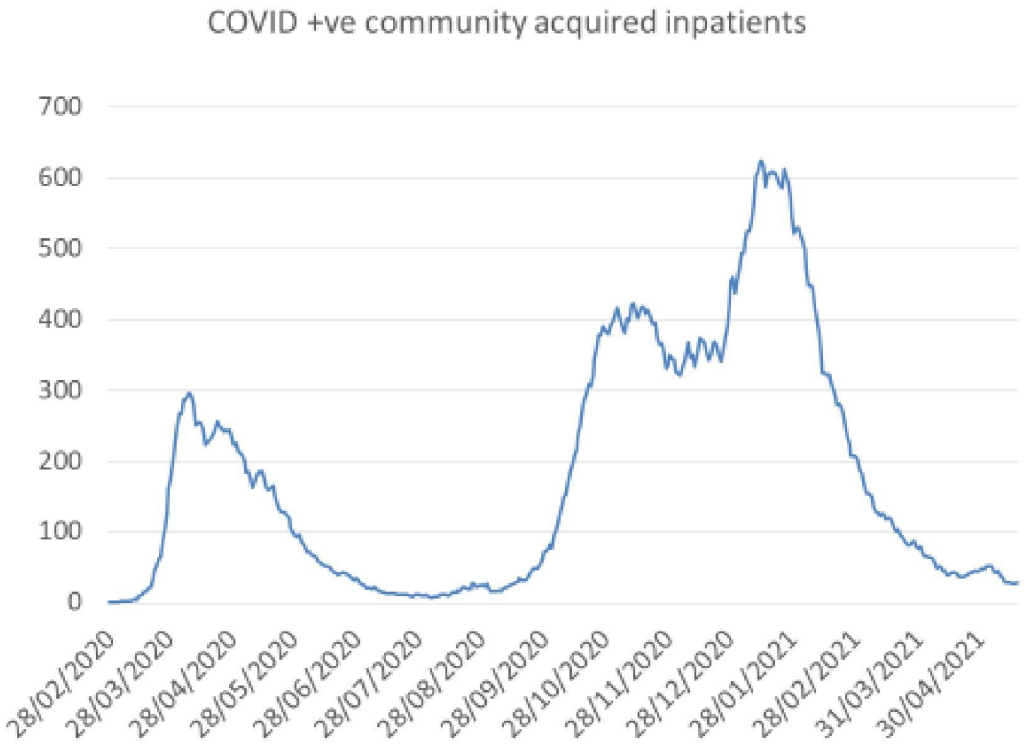

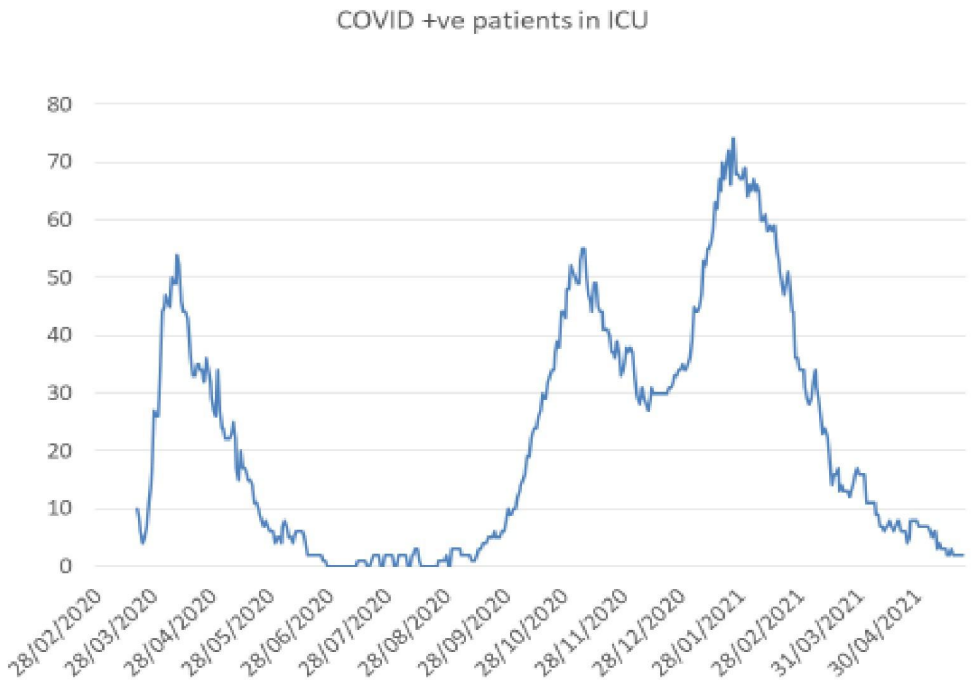

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Update on modelling:

We have previously presented modelling to the Executive based on estimated changes in Rt and vaccination under three scenarios; optimistic, central and pessimistic. At present, we continue to track most closely to the central scenario which indicates a likely peak of around 200 cases per day and no significant increase in hospital pressures over the summer months. However, this modelling does not account for the potential impact of VOC B1.617.2 (up to 60% increase in transmission), the possibility of reduced vaccine uptake or effectiveness, waning immunity or cross border movements, or poor adherence to remaining mitigations.

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Actual numbers vs. modelling projections