Tues 18th 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: 90 (7 days previous 91)

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

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

7 day average of total positive individuals (pillar 1 and 2): 1.0% (7 days previous 1.1%)

7 day daily average tests completed: 10,087 (7 days previous 10,079)

Number of new positive tests in over 60s in last 7 days: 41 (7 days previous 40)

Proportion of total positive tests occurring in over 60s: 6.6% (7 days previous 6.3%)

First COVID-19 +ve hospital admission in last week: 11 (7 days previous 24)

Number of community acquired COVID-19 inpatients: 34 (7 days previous 49)

COVID-19 +ve ICU patients: 2 (6 days previous 7)

The number of new positive cases and percentage of positive tests have been steady over the past week. Derry and Strabane remains at a much higher level than other LGDs. Rt for cases is stable at around 1. Hospital admissions remain at a very low level, so it is no longer possible to provide an accurate value for Rt based on admissions. There has been a further fall in inpatient numbers and ICU occupancy. Overall, there has been no persistent adverse impact of the previous round of relaxations on Rt. Assuming that the relaxations planned for 24th May are confirmed, it will take approximately 3 weeks to see their effect.

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 in the last week and 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 8th May), it was estimated that 1,300 people had COVID-19 (95% credible interval: 300 to 3,000). This equates to 0.07% (95% credible interval: 0.02% to 0.16%) of the population in Northern Ireland or around 1 in 1,430 people (95% credible interval: 1 in 610 to 1 in 5,360). This is compared to the other countries of the UK below.

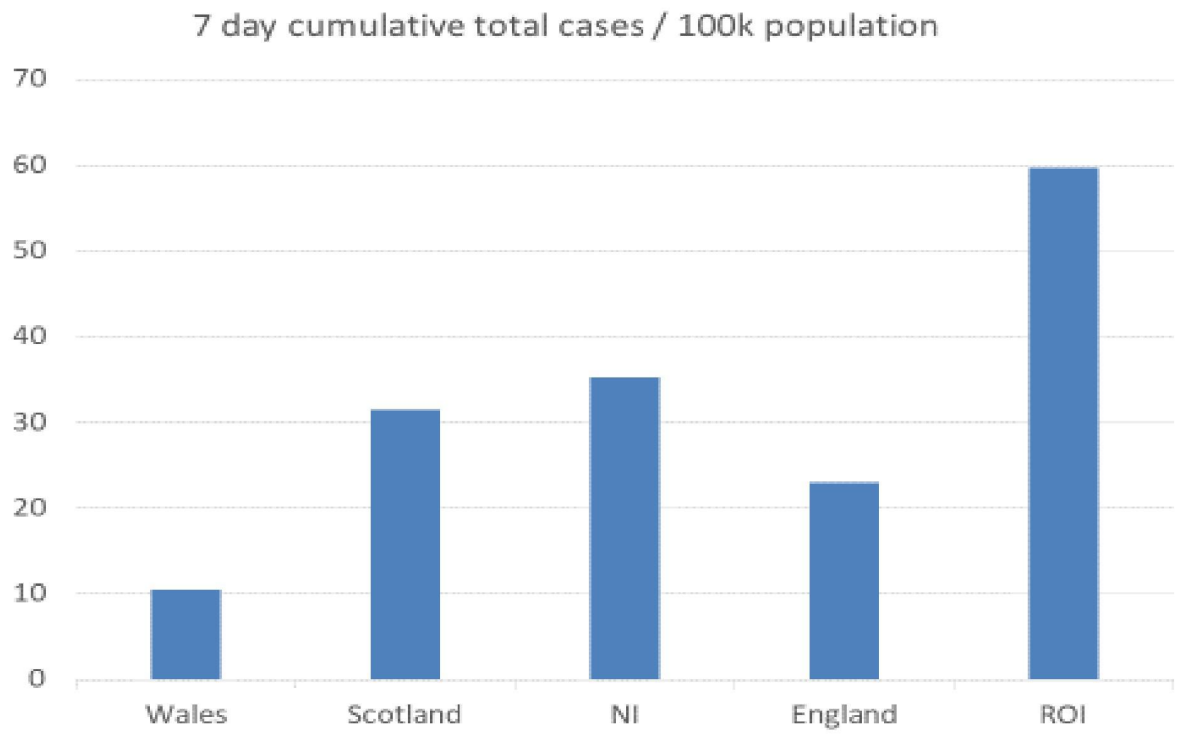
Country	Estimated average % of the population that had COVID-19	95% Credible Interval		Estimate of the number of people testing positive for COVID-19	95% Credible Interval		Estimated average ratio of the population that had COVID-19	95% Credible Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
England	0.07%	0.06%	0.09%	40,800	31,900	50,900	1 in 1,340	1 in 1,710	1 in 1,070
Wales	0.02%	0.00%	0.06%	700	100	1,900	1 in 4,230	1 in 22,280	1 in 1,580
Northern Ireland	0.07%	0.02%	0.16%	1,300	300	3,000	1 in 1,430	1 in 5,360	1 in 610
Scotland	0.08%	0.04%	0.15%	4,200	1,900	7,700	1 in 1,250	1 in 2,730	1 in 690

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

Tues 18th May 2021

NI, UK and Republic of Ireland comparison

In terms of cases reported, NI has a higher incidence than the other countries of the UK, and a lower incidence than ROI based on dashboard figures published by relevant Governments. The gradient between NI and ROI has decreased a little in the last week. These numbers do not take into account different testing strategies in different countries.



Regional variation in cases

Incidence per LGD is shown over the last week in the table below. Cases in Derry City and Strabane remain much higher than in the rest of NI. Cases in neighbouring parts of Donegal are at an even higher level. Work is ongoing to understand and address relevant factors.

Tues 18th May 2021

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

8th May	9th May	10th May	11th May	12th May	13th May	14th May	15th May	16th May	LGD
47	45	41	43	39	34		25	25	Antrim and Newtownabbey
4	6	6	6	8	9		8	6	Ards and North Down
29	30	27	29	26	25		23	24	Armagh City, Banbridge and Craigavon
18	20	20	20	24	23		23	23	Belfast
45	45	49	51	49	46		44	43	Causeway Coast and Glens
82	89	93	92	99	108		102	100	Derry City and Strabane
30	29	29	32	34	33		30	26	Fermanagh and Omagh
25	23	19	15	11	15		13	16	Lisburn and Castlereagh
17	16	18	18	16	14		9	9	Mid and East Antrim
35	37	39	44	44	46		50	50	Mid Ulster
45	46	43	41	43	49		39	39	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.

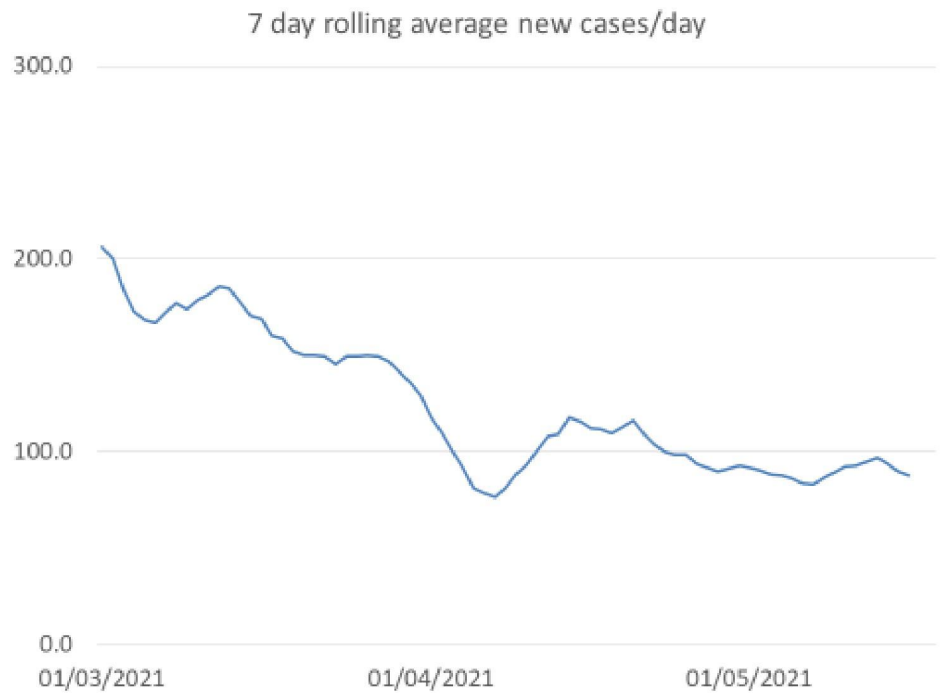
In addition to the impact of the mathematical model used, the calculated value of Rt is also influenced by the choice of input variable. Rt calculated for new COVID-19 cases will not be the same as Rt calculated for hospital admissions, or ICU occupancy, or deaths. There may be a significant lag (2-3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

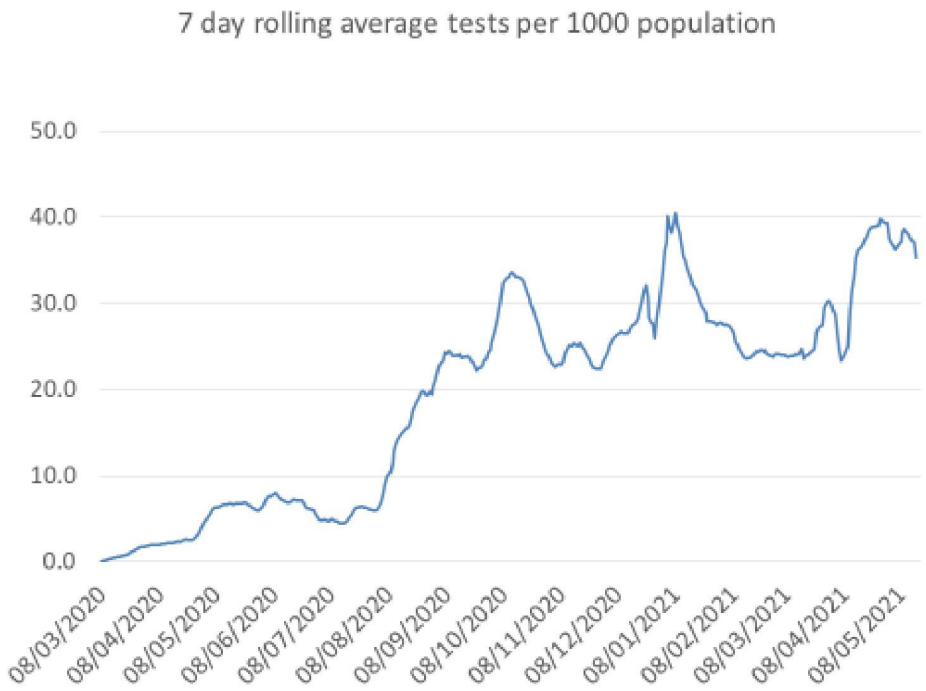
Trends for Northern Ireland

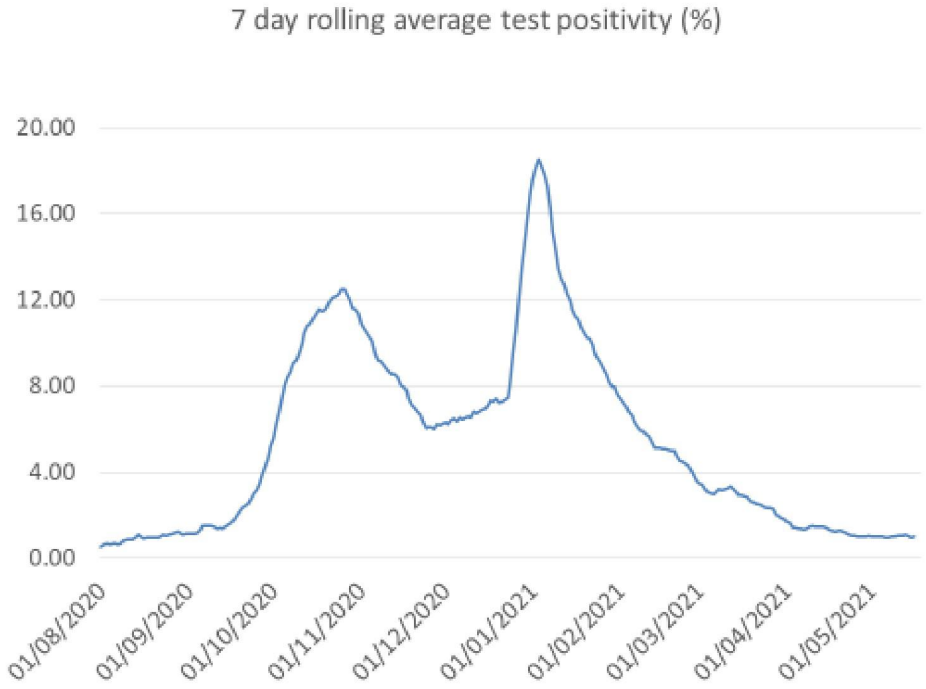
The value of Rt is 0.80 – 1.10 for cases.

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



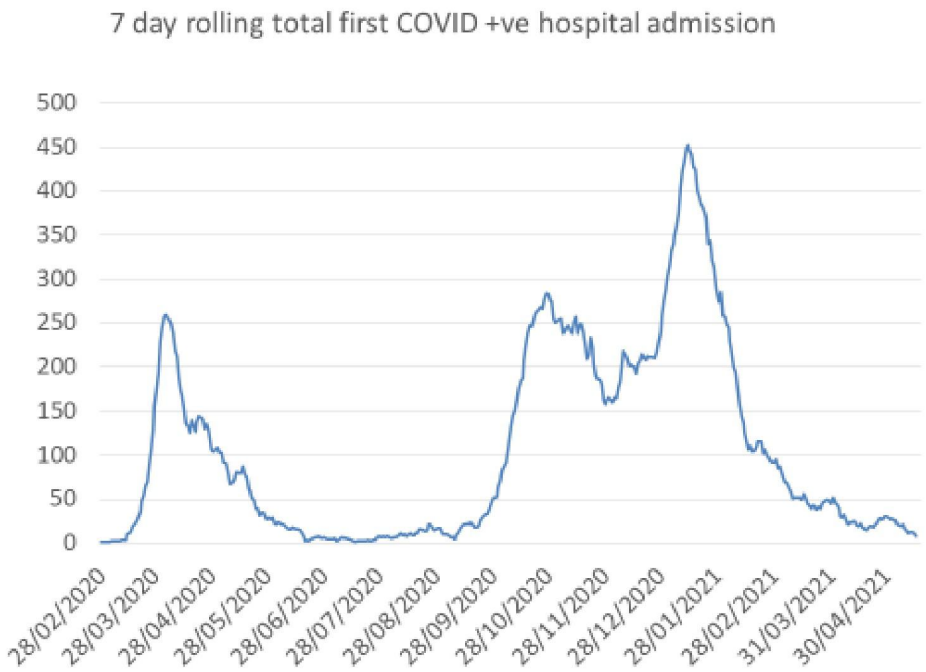
Tues 18th May 2021

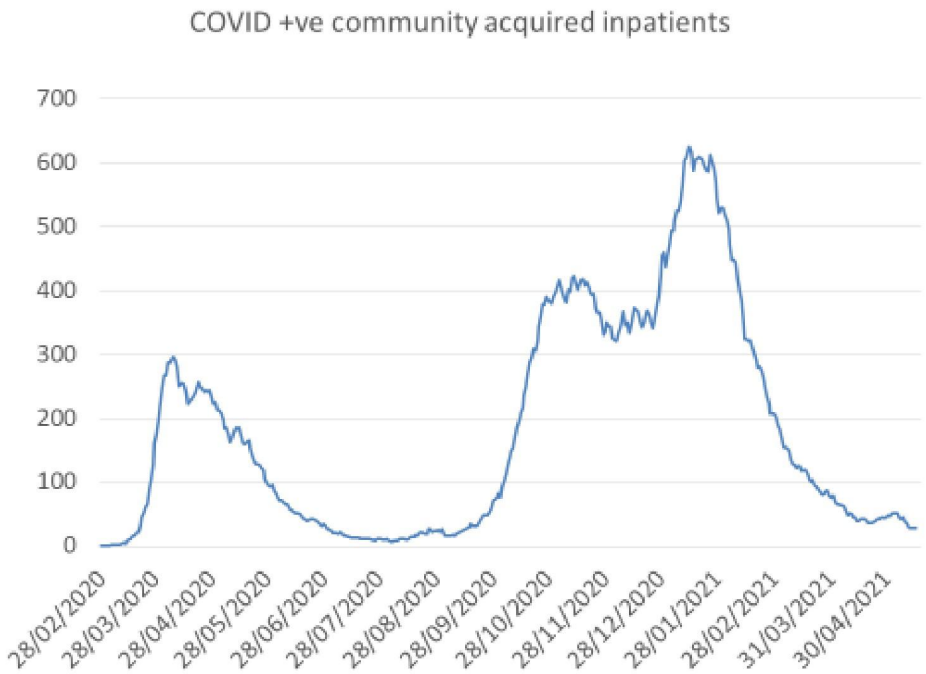




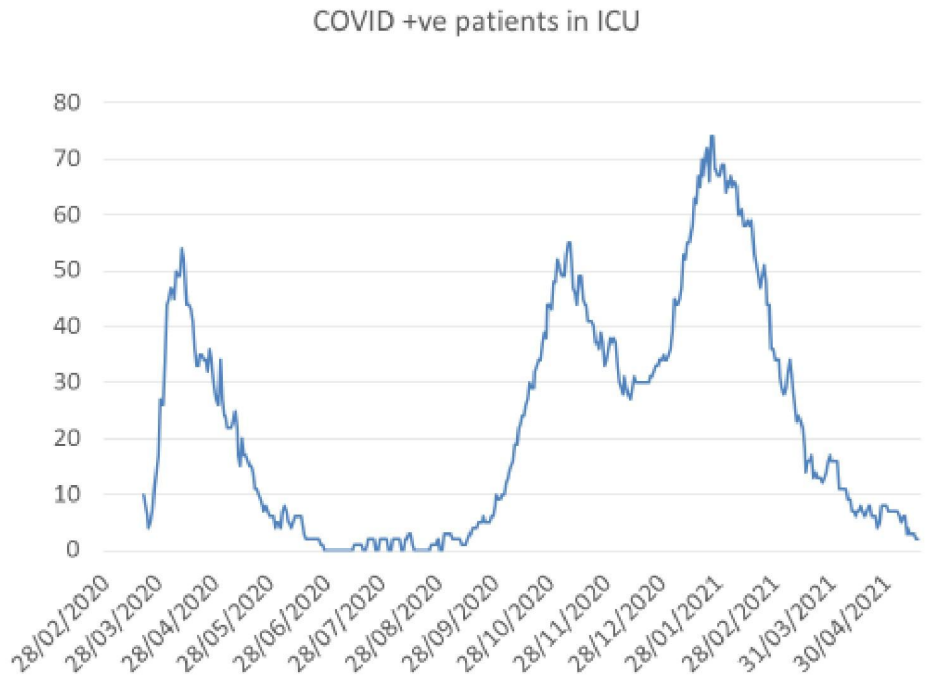
The following graphs show first hospital admission of COVID positive patients over a rolling 7-day period and the number of hospital inpatients. Admissions have remained

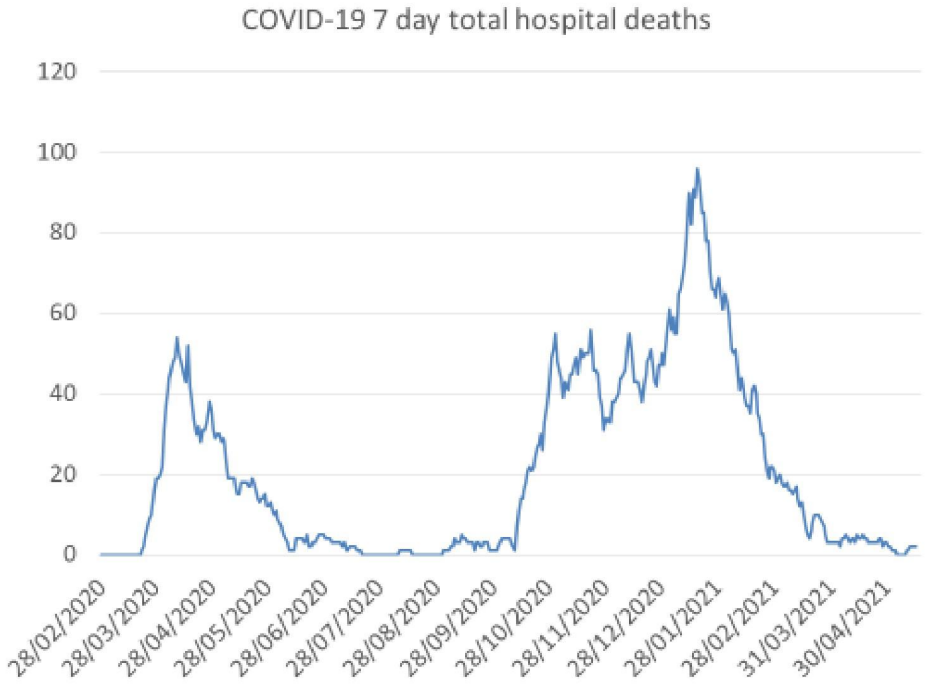
stable at a low level in the last week, while total occupancy and ICU occupancy have fallen. In hospital deaths are currently very low.





Tues 18th May 2021





Update on modelling:

Tues 18th May 2021

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 are tracking 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.

We have recently completed further modelling which considers the impact of B1.617.2 becoming the dominant variant in NI in mid June, and this is attached as Appendix A. In addition, SAGE modelling groups based in Warwick and Imperial College have modelled the potential course of the epidemic in each of the four countries of the UK and their findings are attached as Appendices B and C. These have not as yet been published and should therefore be considered as confidential until they enter the public domain.

It should be noted that under a pessimistic scenario all models indicate that cases could peak at 5000 – 15000 per day, with hospital pressures similar to or a little less than those observed in January / February this year. None of these models are predictions, but they indicate the importance of continuing to ensure a high level of adherence to basic mitigations, and in addition that risk assessment around indoor gatherings is robust, effective, subject to meaningful audit and enforced.