SPI-M-O
Medium-Term Projections

17th November 2021

SPI-M-O Medium-term Projections

- **These projections are not forecasts or predictions**. **They represent a scenario in which the trajectory of the epidemic continues to follow the trends that were seen in the data up to 15th November.**

- The delay between infection, developing symptoms, the need for hospital care, and death means they cannot fully reflect the impact of policy and behavioural changes made in the two to three weeks prior to 15th November.

- **The projections do not include the effects of any future policy or behavioural changes.** The effect of school opening and closing has been included.

- **The course of the epidemic has oscillated in several nations and regions over recent weeks. Producing reliable projections is challenging when the epidemic is fluctuating and trends in different data streams conflict.**

- Predicting the peak of the epidemic in a particular nation or region is difficult and prone to large levels of uncertainty. Any changes in behaviour will impact transmission and alter the trends shown in the projections.

- **The projections include the impact of vaccines given over the next four weeks.** This has been based on a rollout scenario provided by Cabinet Office for modelling purposes. The rollout scenario assumes booster doses are administered according to JCVI's advice. The scenario also includes the vaccination programme for 12 to 15-year olds. It will take time for the continued rollout of doses to impact the epidemic, given lags between vaccination and protection, and between infection and hospital admission.

- Modelling groups have used their expert judgement and evidence from Public Health England, Scottish Universities & Public Health Scotland, and other published efficacy studies when making assumptions about vaccine effectiveness. A table summarising these assumptions is available in the annex.

- Not all modelling groups produce projections for both hospitalisations and deaths, so there will be some differences between the models included in the combined projections for each metric.

Metrics:
- **New hospitalisations per day:** Number of individuals admitted with COVID-19 and inpatients newly diagnosed with COVID-19. Data definitions differ slightly across all four nations.

- **New deaths per day (by date of death):** The number of COVID-19 deaths within 28 days of a positive test. Data definitions differ slightly across all four nations.

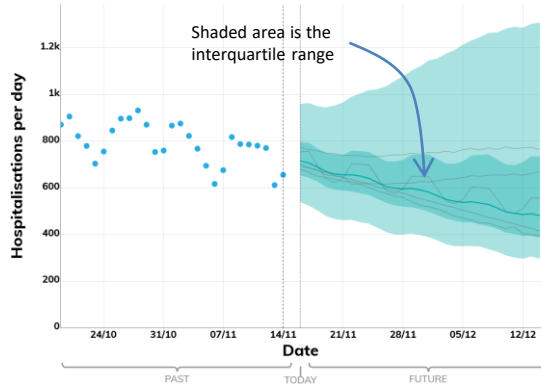# Modelled projections based on trends to 15th November 2021

New hospital admissions per day

These projections are based on current trends and will not fully reflect the impact of policy or behavioural changes over the past two to three weeks. They are not forecasts or predictions.
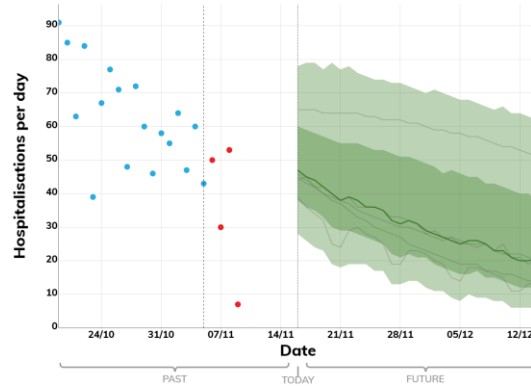
ENGLAND

Shaded area is the interquartile range

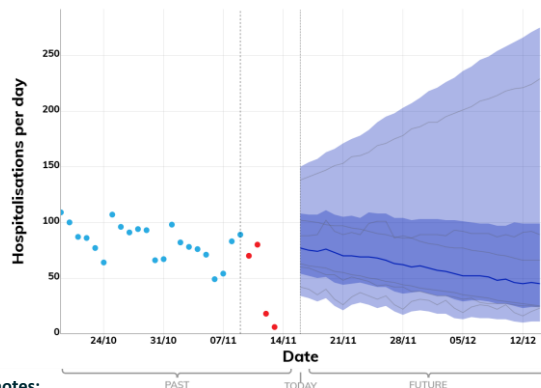### WALES

SCOTLAND

NORTHERN IRELAND

Lighter shaded area is the 90% credible interval
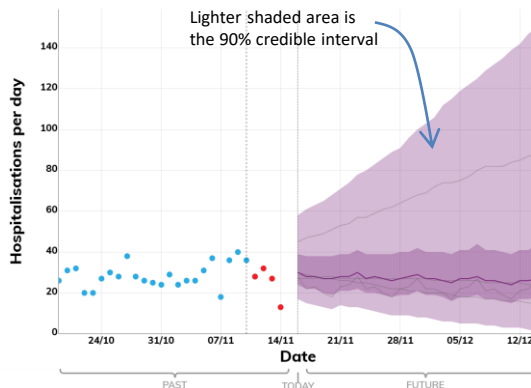
The fan charts show the **90% credible interval and interquartile range** of the combined projections based on current trends.

The delay between infection, developing symptoms, the need for hospital care, and death means they cannot fully reflect the impact of policy or behavioural changes in the two to three weeks prior to 15th November. **The projections do not include the effects of any future policy or behavioural changes**.

These projections include the potential impact of vaccines to be given over the next four weeks. This has been based on a rollout scenario provided by Cabinet Office for modelling purposes. It will take time for the continued rollout of doses to impact the epidemic, given lags between vaccination and protection, and between infection and hospital admission.

Data notes:
England: Number of patients admitted with confirmed COVID-19 and the number of inpatients diagnosed with COVID-19 in the past 24 hours. Taken from NHSE COVID-19 Situation reports.
Wales: Number of patients admitted with confirmed COVID-19 and inpatients diagnosed with COVID-19. Provided by Public Health Wales.
Scotland: Number of patients who tested positive for COVID-19 in the 14 days prior to admission, on the day of admission, or during their stay in hospital. Readmissions within 14 days of a positive test are excluded. Provided by Public Health Scotland.
Northern Ireland: Number of patients admitted with confirmed COVID-19 and inpatients diagnosed with COVID-19. Provided by Health and Social Care Northern Ireland.
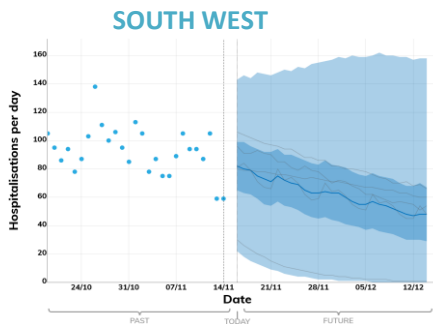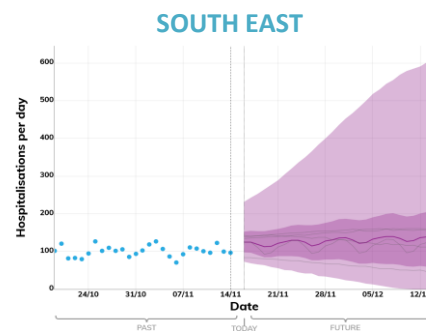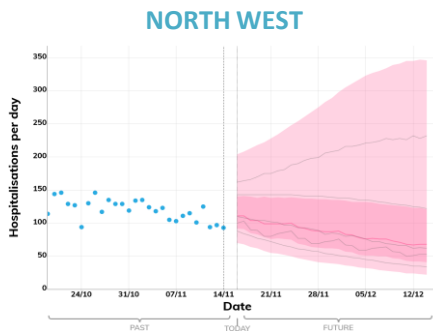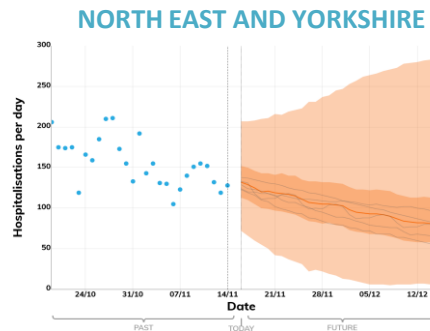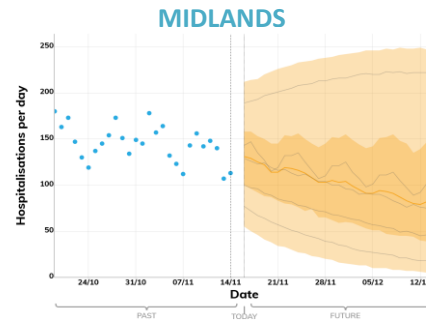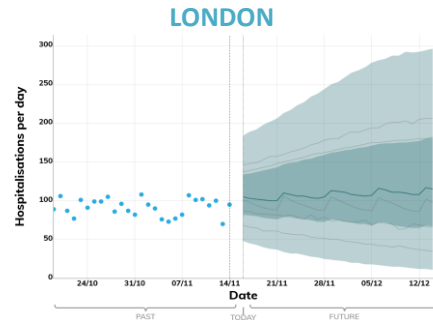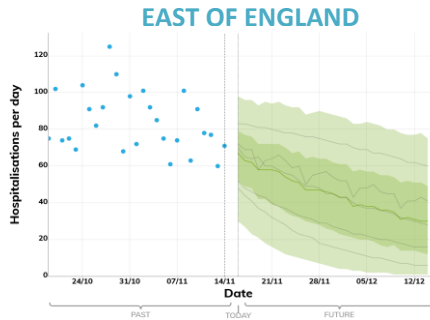
Modelled projections based on trends to 15th November 2021

New hospital admissions per day

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EAST OF ENGLAND

LONDON

MIDLANDS

NORTH EAST AND YORKSHIRE

NORTH WEST

SOUTH EAST

SOUTH WEST

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Data notes:
England: Number of patients admitted with confirmed COVID-19 and the number of inpatients diagnosed with COVID-19 in the past 24 hours. The past data is taken from the NHS England COVID-19 Sitreps.

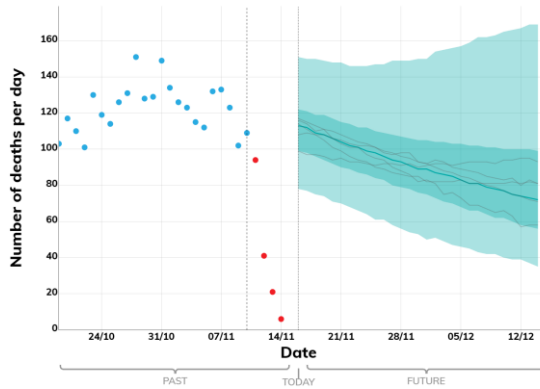# Modelled projections based on trends to 15th November 2021

New deaths per day

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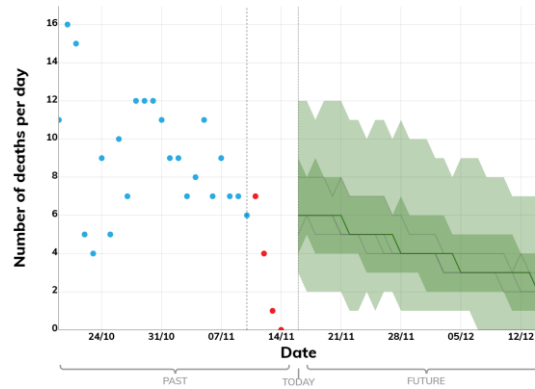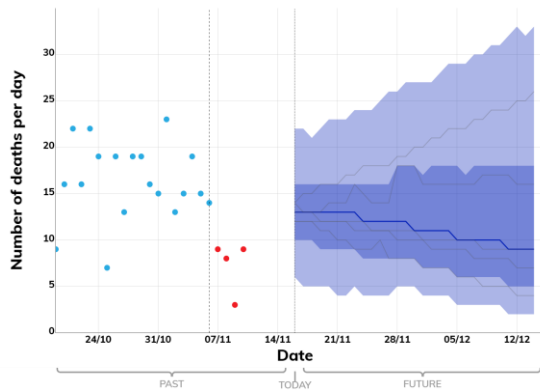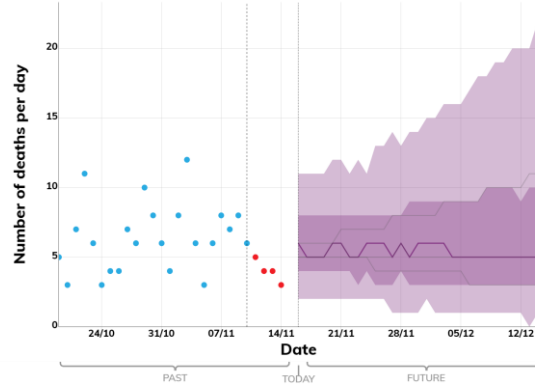
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Data Notes:
The number of COVID-19 deaths (by date of death) within 28 days of a positive test.
The past data for England is taken from the PHE line list of deaths. The past data for Scotland, Wales, and Northern Ireland is taken from the Coronavirus (COVID-19) in the UK dashboard on Gov.uk.
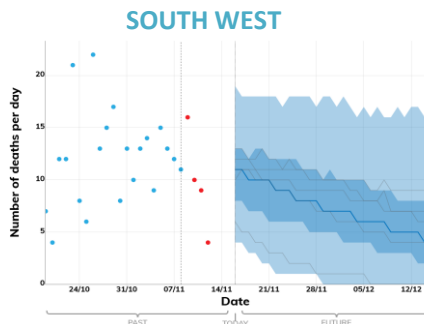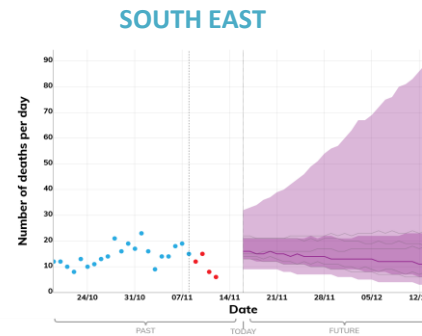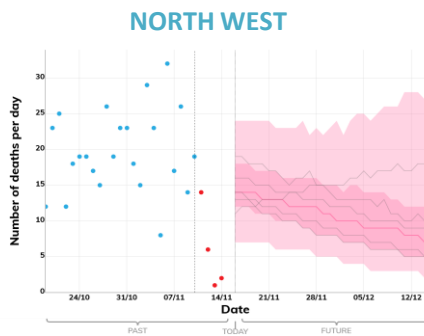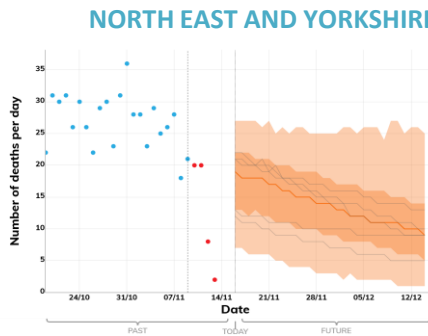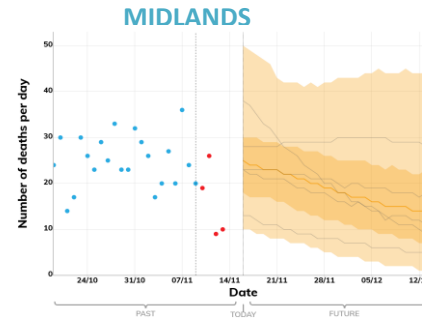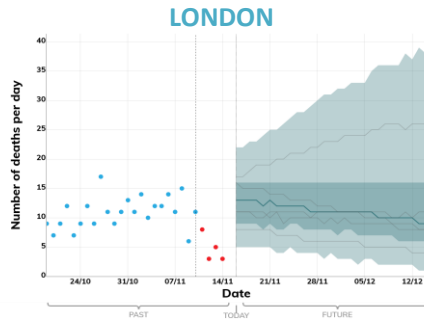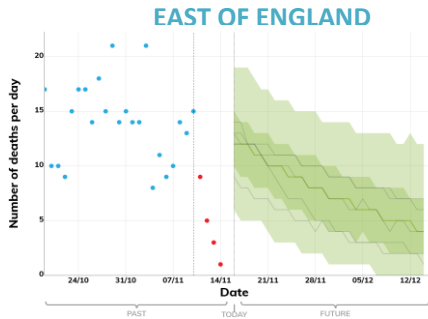
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Data Notes:
The number of COVID-19 deaths (by date of death) within 28 days of a positive test.
The past data for England is taken from the PHE line list of deaths.

Annex: SPI-M-O Vaccine Effectiveness Assumptions

The LSHTM EpiNow model has also been included in the combined projections. This model projects forward based on the recent trends in the data and doesn't explicitly include the impact of vaccination. However, the protection provided by vaccinations given to date will be reflected in the data and therefore implicitly included in the projections produced by the model.

		Pfizer BioNTech			Oxford-AstraZeneca		Moderna		
		1 Dose	2 Doses	Booster [5]	1 Dose	2 Doses	1 Dose	2 Doses	Booster [5]
Reduction in risk of infection [1]	Imperial [2]	33%	85%	92%	33%	58%	33%	85%	92%
	Manchester [2,3]	75%	75%	75%	75%	75%	75%	75%	75%
	Warwick [2]	55%	85%	92%	45%	70%	55%	85%	92%
	PHE/Cambridge [2]	31%	80%	80%	31%	80%	31%	80%	80%
	Scottish Government [2]	55%	75%	-	40%	65%	75%	85%	-
Reduction in risk of onward transmission, in addition to reduction from lower infection risk [1]	Imperial [2]	33%	40%	40%	33%	40%	33%	40%	40%
	Manchester [2,3,4]	-	-	-	-	-	-	-	-
	Warwick [2]	30%	30%	45%	30%	30%	30%	30%	45%
	PHE/Cambridge [2,4]	-	-	-	-	-	-	-	-
	Scottish Government [2]	29%	40%	-	37%	44%	29%	40%	-
Reduction in risk of hospitalisation [1]	Imperial [2]	85%	95%	99%	80%	90%	85%	95%	99%
	Manchester [2,3]	75%	75%	75%	75%	75%	75%	75%	75%
	Warwick [2]	80%	95%	95%	80%	95%	80%	95%	95%
	PHE/Cambridge [2]	78%	97%	97%	78%	97%	78%	97%	97%
	Scottish Government [2]	80%	95%	-	80%	95%	80%	95%	-
Reduction in risk of death [1]	Imperial [2]	85%	95%	99%	80%	95%	85%	95%	99%
	Manchester [2,3]	75%	75%	75%	75%	75%	75%	75%	75%
	Warwick [2]	80%	98%	98%	80%	98%	80%	98%	98%
	PHE/Cambridge [2]	78%	97%	97%	78%	97%	78%	97%	97%
	Scottish Government [2]	80%	95%	-	80%	95%	80%	95%	-

[1] The assumed delay between vaccination and protection varies between 10 and 21 days for dose 1 and between 7 and 21 days for dose 2 across the modelling groups.

[2] Warwick's model considers a range of scenarios for the partial waning of vaccine effectiveness. The results from these scenarios are then combined to form their projection. Imperial's model considers waning of vaccine induced immunity to follow an exponential distribution, with a mean time from 2nd dose to waned of 20 weeks, with individuals in the waned compartment having vaccine efficacy reduced from dose two levels to waned levels. The Manchester, PHE/Cambridge and Scottish Government models do not currently include any assumptions for waning of immunity.

[3] Manchester's model does not split vaccine effectiveness by vaccine type or different doses.

[4] The Manchester and PHE/ Cambridge models do not include a reduction in the risk of onwards transmission after receiving either vaccine.

[5] It is assumed that the booster doses administered will be either the Pfizer BioNTech or Moderna vaccines, as per advice from JCVI.