NIESR

Bi-Weekly Covid-19 Tracker

New cases forecast to decline in all but the young

Tracker Number 23

23 September 2021

National
Institute of
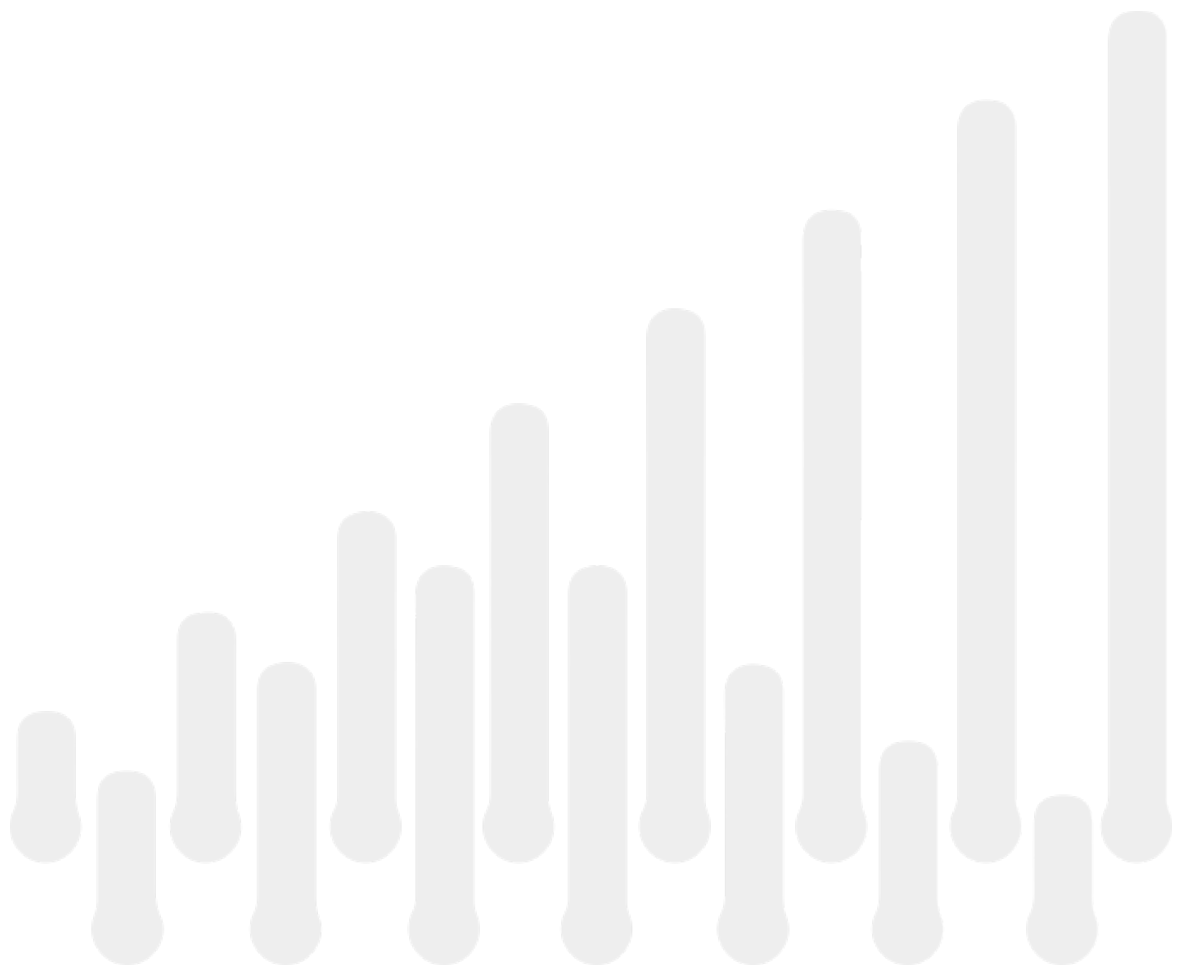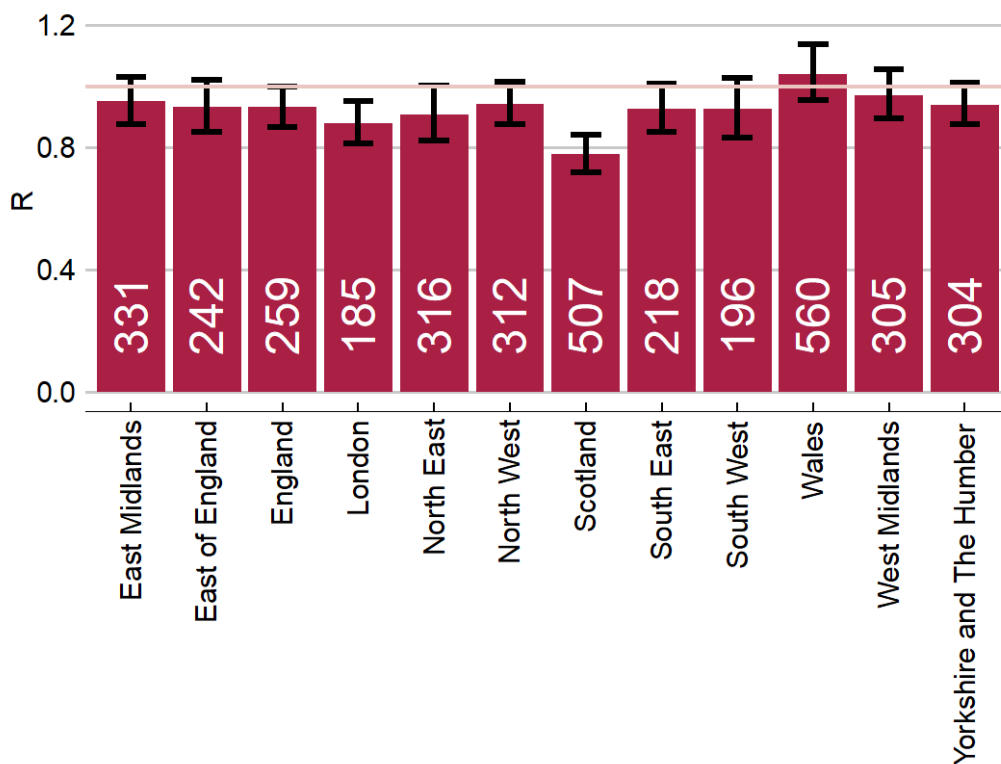Economic and
Social Research

Figure 1 – R: UK Regional R and Seven-day Case Counts per 100,000 Population

Bar chart shows point estimates of R and the ± 1 standard deviation confidence intervals. The numbers in each bar represent the count of cases in the last seven days of the estimation sample per 100,000 population.

Main Points

- We report R estimates and forecasts of new cases and hospital admissions for England and Scotland.
- The R number has fallen below 1 in all nations and regions apart from Wales where it is slightly above 1 (Figure 1).
- For the adult population in England, we forecast declines in new cases. However, new cases for the sub-ten age group is forecast to increase while those for the 10-19 age group is expected to remain flat (Figure 2).
- We forecast decreases of new Covid-19 cases for all English regions (Figure 3). Similar decreases can be expected for England and Scotland also (Figure 4).
- Hospital admissions are forecast to decrease slightly, dropping below the 1000-per-day mark (Figure 5).

- The proportion of those over 16 who have received their first dose is 90 per cent; 82 per cent have also received their second dose. This summary figure conceals important heterogeneity across age brackets (Figure 6). Importantly, less than 50 per cent of those under 30 are currently fully vaccinated.

"For England, new cases are forecast to decline in all age groups apart from the young school aged population. The recent increase is primarily due to schools reopening. To the extent that English regions follow the patterns of those that reopened earlier, namely Scotland and Leicestershire where schools reopened around 18th and 23rd August respectively, we can expect the cases amongst the young to subside in the coming weeks. Looking ahead, the next test will be University students returning to campus."

Dr Craig Thamotheram
Senior Economist - Macroeconomic Modelling and Forecasting

Results

Figure 2: England Forecasts of New COVID-19 Cases by Age Brackets
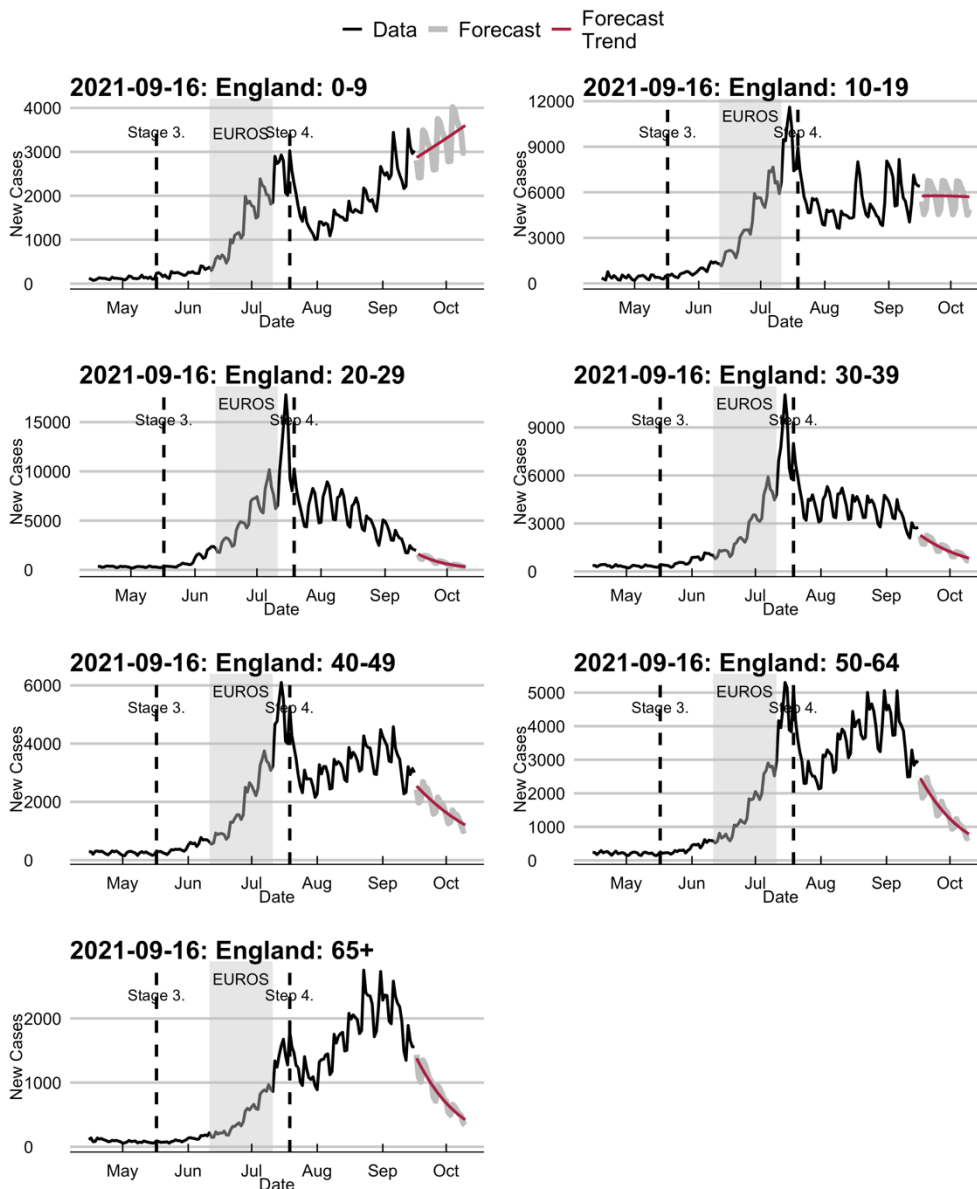

Figure 2 provides forecasts of daily cases of Covid-19 for the period until mid-October for England by age brackets. New cases are forecast to decline for all age groups apart from the youngest (under 20).

Figure 3 provides forecasts of daily cases of Covid-19 for the period until mid- October for the regions of England, based on data released on the 21st September. There are likely to be modest declines in cases for all English regions.

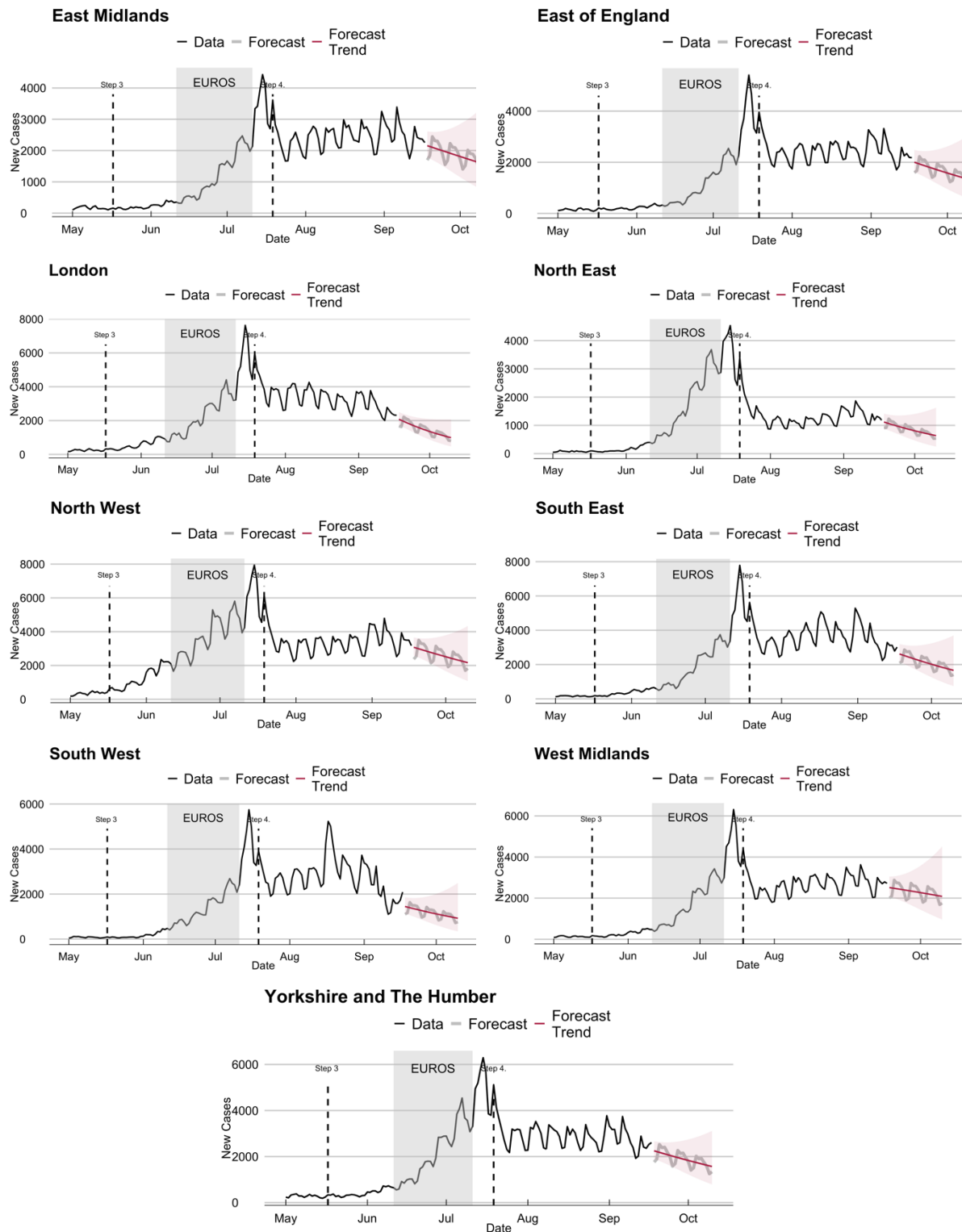## Figure 3 – Regional Forecasts of New COVID-19 Cases

Figure 4 provides forecasts of daily cases of Covid-19 for the period until mid-October for England and Scotland with data released on the 21st September. The uptick in cases in mid-August for Scotland is primarily due to increased testing associated with schools reopening.

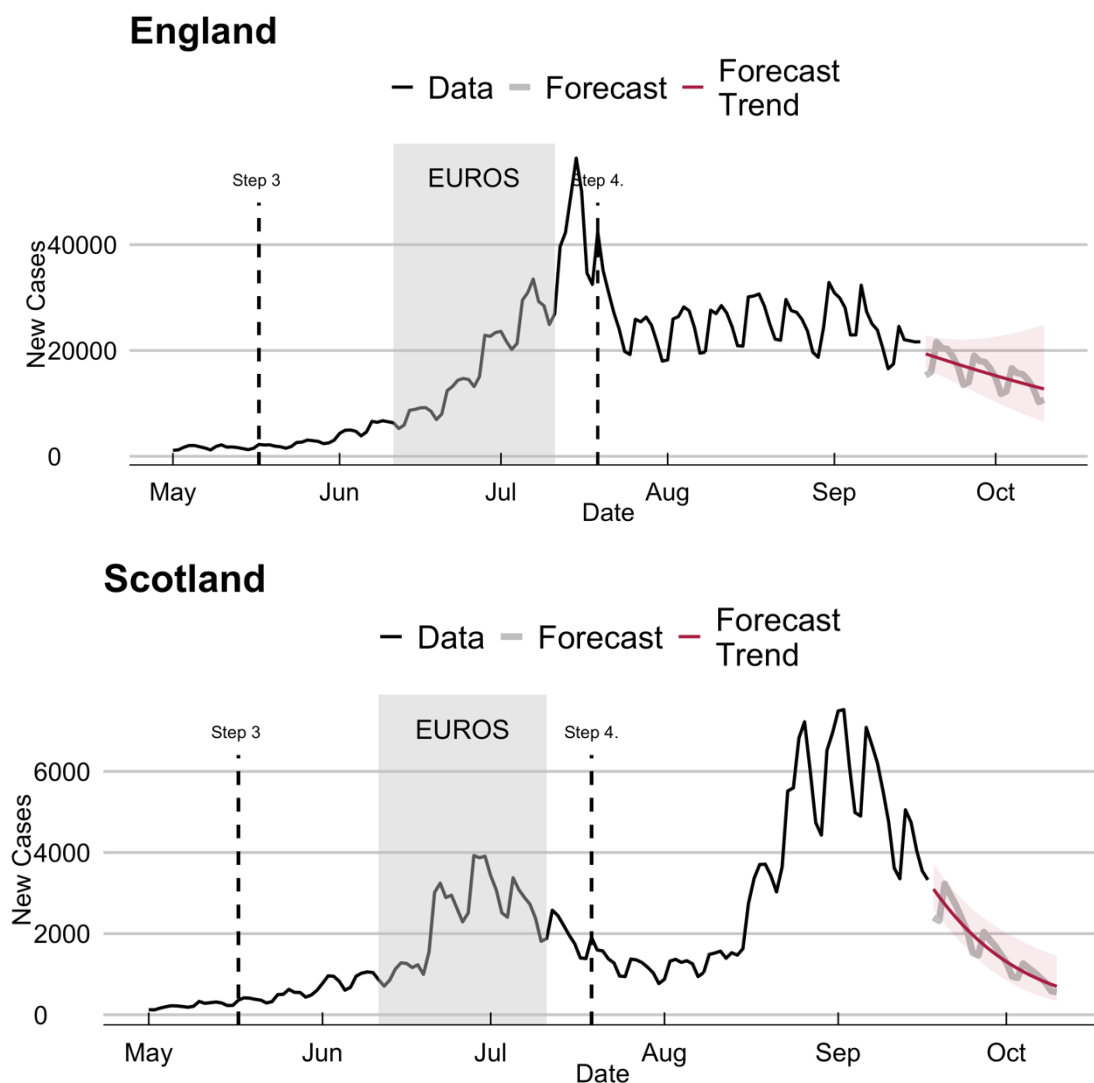**Figure 4 –** National Forecasts of New COVID-19 Cases

Figure 5 provides forecasts of daily hospital admissions for Covid-19 and highlights the underlying number of new admissions to be expected until mid-October.

Figure 5 – UK Forecast of Daily Covid-19 Hospital Admissions

Vertical dashed lines show trend Admissions on 19 July.
Admissions data avaiable up to 21 September 2021, but there is a
5 to 8 day lag in data collection. Hence, the estimation
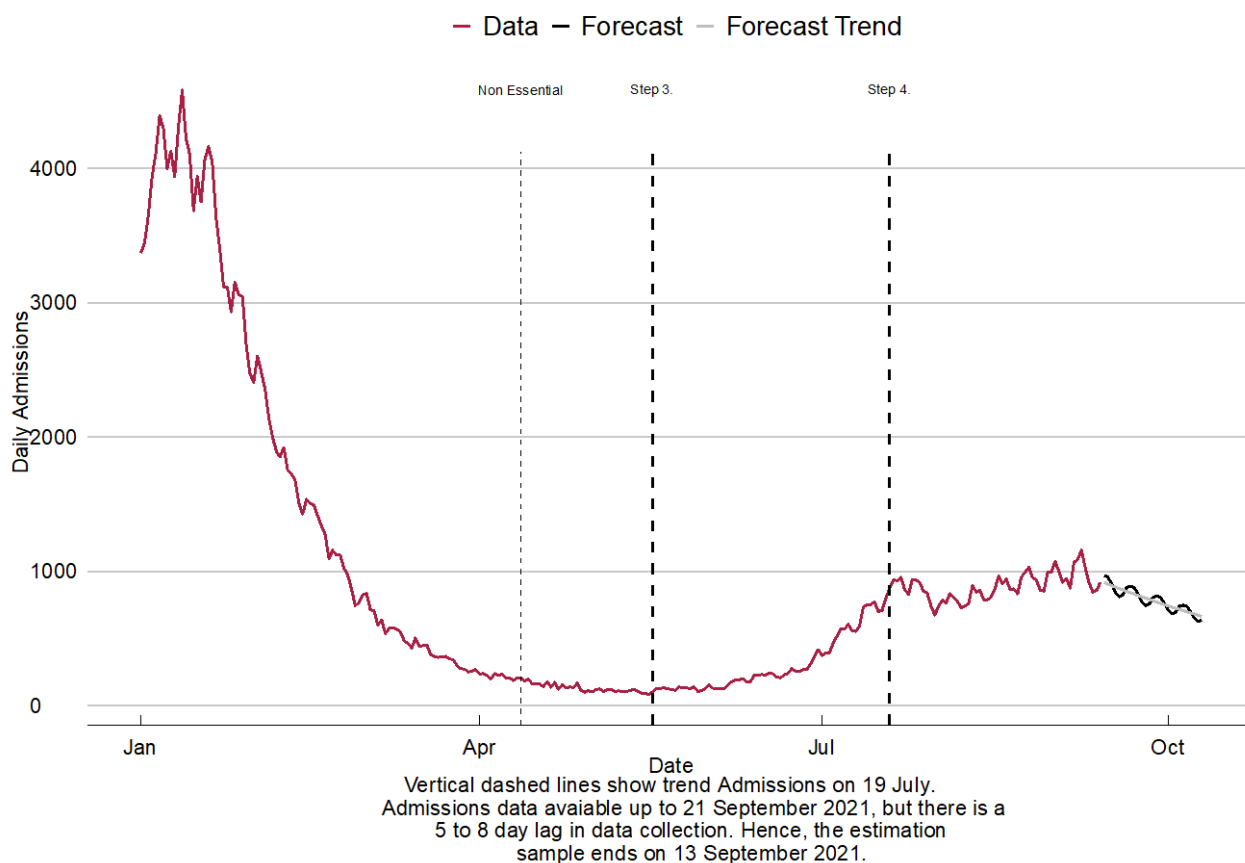sample ends on 13 September 2021.

Figure 6 provides data on the percentage of England's adult population that has been vaccinated broken down by age groups. It highlights the larger unvaccinated proportion of the younger adult population at the point of reopening, and the fact that the older population have now been fully vaccinated for a duration consistent with levels of antibody waning according to sero-prevalence research.

Figure 6 – England Vaccination Percentages by Age Brackets
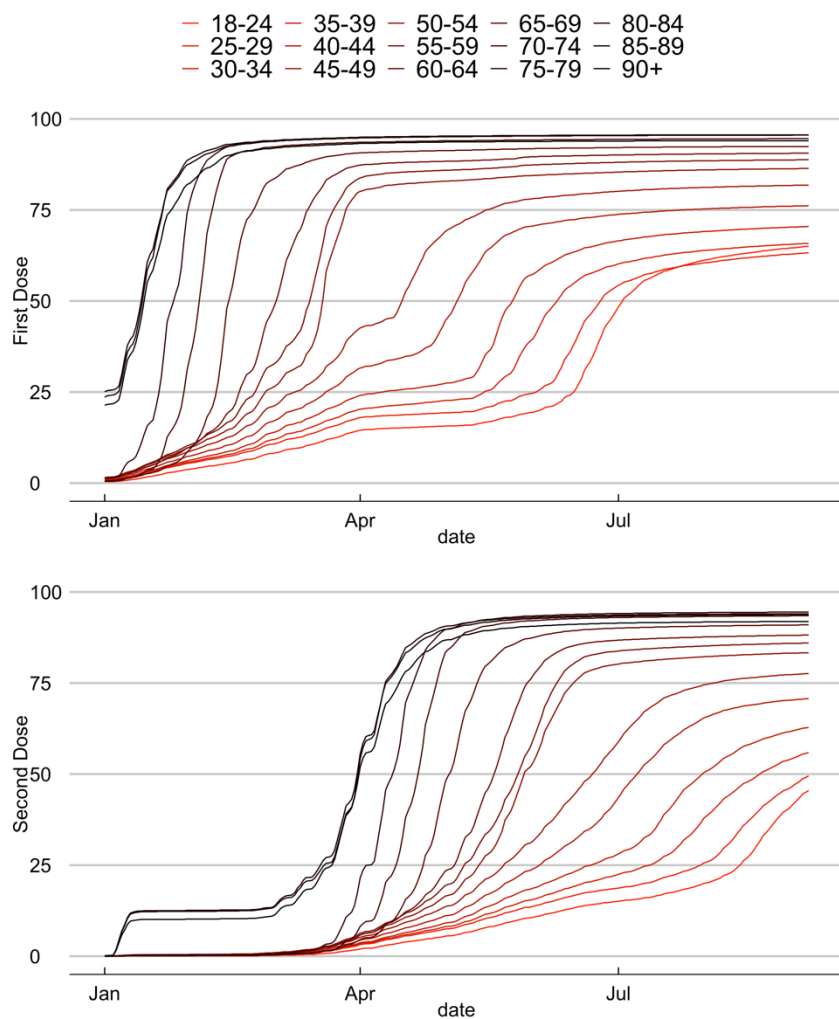
Background

NIESR aims to set out projections of the future path of the Covid-19 epidemic in the United Kingdom, its constituent nations and the regions of England, based on current policies.

NIESR has been producing weekly updates on Thursdays, projecting new cases and estimating the R number using a class of time series models developed by Prof. Andrew Harvey and Dr. Paul Kattuman of Cambridge University; see Harvey and Kattuman (2020a). From June 3, 2021 onwards NIESR have been producing fortnightly updates on Thursdays, focusing on monitoring whether sudden increases observed are local spikes or are indicative of the start of a new wave.

The models generate forecasts by extracting changing trends from historical data. They are relatively simple and transparent, and their specifications can be assessed by standard statistical test procedures. The advantage of the time series approach is that it can adapt very quickly to the most recent information and hence produce timely estimates. This flexibility enables the effects of changes in policy, virus mutations and human behaviour to be tracked. The models are data driven and so are different from the structural models used by epidemiologists which rely on assumptions about transmission and behaviour; see Avery et al (2020).

A description of the methods used to produce these estimates and an evaluation of their forecasting performance can be found in Harvey, Kattuman, and Thamotheram (2021).

Data

Data: COVID-19 confirmed cases and deaths data are sourced from https://coronavirus.data.gov.uk

Data on Covid-19 cases are reported by the government by 'specimen date' and by 'published date'. Specimen cases relate to the date when the sample was taken from the person being tested, while published cases relate to the first date when they are included in the published numbers. At the present time we regard the specimen date data as a more reliable indicator of the trend in new cases. The model based on specimen dated observations has better captured the effect of the sharp increase in testing on the day that schools reopened and also suffers less from data errors or revisions.

On 27 March 2021, 850 historic cases were removed due to a laboratory processing error. This affected specimen date data between 23 and 25 March in local authorities primarily in the North East and Yorkshire. The cumulative total number of people tested positive was revised down on 27 March 2021. Historic published date totals have not been changed. The downward correction on 27th March is mixed with the positive upward revisions of cases as more test results are returned over time making it impossible to date these corrections accurately. Thus, we cannot back out on which day these corrections were made. For published data, we choose to remove 300, 300 and 250 cases on 24, 25 and 26th of March respectively.

Between 2nd to the 5th April significant disruption to cases and deaths for Wales and Northern Ireland occurred. This was corrected on the 6th April but with a 48-hour reporting period. As the last date in the estimation sample for specimen cases is April 2nd we will decide how to account for this change in next week's forecast. We leave published cases unchanged.

On April 9th rapid LF tests that are confirmed as negative by Polymerase Chain Reaction (PCR) test within 3 days were removed. For published cases, we set 9th April as missing as no correction is applied to the historic data by Public Health England

Caveat

The model relies on historical data and does not incorporate future outlined changes in the underlying environment. Thus, it is important to read the forecasts in this context. For example, the current forecasts make no assumptions about the effect of reopening non-essential retail on increasing transmissions. On the other hand, the effect of the vaccine program will be in the opposite direction.

Authors

Professor Andrew Harvey is Emeritus Professor of Econometrics at the University of Cambridge and a Fellow of Corpus Christi College. He has published over 100 articles and is the author of four books: *The Econometric Analysis of Time Series* (1981), *Time Series Models* (1981), *Forecasting. Structural Time Series Models and the Kalman Filter* (1989) and *Dynamic models for Volatility and Heavy Tails* (2013). He is a Fellow of the British Academy and the Econometric Society.

Dr Paul Kattuman is a reader in Economics at Cambridge University. He has been a Senior Research Fellow at the University of Cambridge Department of Applied Economics, and a lecturer in economics at Durham. He has held Visiting Professorships at Université Paris 12 and Paris-Est Créteil and was appointed Grupo Santander Visiting Professor at Universidad Complutense de Madrid. He was visiting Faculty Scholar at the Kennedy School of Government, and at the Department of Statistics, both at Harvard University.

Dr Craig Thamotheram is a Senior Economist at NIESR. Prior to joining NIESR, he studied Engineering at Imperial and obtained a PhD in Economics at Warwick. He has work experience as a post-doc in macro and financial econometrics.

Bibliography

Avery, C., W. Bossert, A. Clark, G. Ellison, and S. F. Ellison (2020). An economist's guide to epidemiology models of infectious disease. *Journal of Economic Perspectives 34(4), 79–104*.

Harvey, A. and P. Kattuman (2020a). Time series models based on growth curves with applications to forecasting coronavirus. *Harvard Data Science Review*, Special issue 1 - COVID -19. https://hdsr.mitpress.mit.edu/ pub/ozgjx0yn

Harvey, A. and P. Kattuman (forthcoming). A farewell to R: Time series models for tracking and forecasting epidemics. *Journal of the Royal Society Interface*

Harvey, A., P. Kattuman, and C. Thamotheram (2021). Tracking the mutant: forecasting and nowcasting COVID-19 in the UK in 2021. *National Institute Economic Review, 256, 110--126.* *https://doi.org/10.1017/nie.2021.12*.

Notes for Editors

For further information please contact the NIESR Press Office: press@niesr.ac.uk or Luca Pieri on 020 7654 1954 / l.pieri@niesr.ac.uk

National Institute of Economic and Social Research
2 Dean Trench Street
Smith Square
London, SW1P 3HE
United Kingdom

Switchboard Telephone Number: 020 7222 7665
Website: http://www.niesr.ac.uk