Nowcasting in the UK during the COVID-19 pandemic

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During infectious disease outbreaks, metrics such as the incidence of cases and hospitalisations are often used to assess changes in epidemic dynamics in real-time. However, reporting delays between disease onset and case reporting often result in these metrics appearing artificially low towards the present day. This is because those metrics do not account for cases that have occurred but have not yet been reported, also known as 'right-censoring'.[1] To remedy this, the latest data are often truncated by a fixed amount of time before conducting any further analysis or presenting the data (in other words, up-to-date assessments are not obtained).

As an alternative to truncation, nowcasts can be conducted, which use existing data in the preceding period in addition to the incomplete recent data to estimate the value that a given metric will take once all measurements are complete. Nowcasts have been used extensively during epidemics: for example, to estimate the daily number of hospital admissions during the STEC O104:H4 outbreak in Germany[2] and the daily incidence of COVID-19 cases in Bavaria.[3] These models generally adjust for right-censoring by estimating the expected final value of a given metric jointly with the delay distribution for each date, the latter of which is estimated from reported cases for which both the date of onset and reporting are known.

The objective of this project is to develop a statistical modelling framework for nowcasting the incidence of COVID-19 cases and deaths in the UK using publicly available data from the UK COVID-19 dashboard. The availability of both latest and archived data from the dashboard presents the opportunity to validate the retrospective nowcasting models and systematically compare different modelling approaches. This project builds on existing work by the EpiForecasts research group (led by co-supervisor of this project Prof. Sebastian Funk) at the London School of Hygiene & Tropical Medicine in their contribution to the nowcasting of COVID-19 hospitalisations in Germany. That group has also developed the the epinowcast R package.[4]

References

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