# Economic evaluation of neutralising mononoclonal antibodies for the treatment of COVID-19 in UK non-hospitalised patients

Metry A[1], Rafia R[1], Wailoo A[1]

[1]The University of Sheffield, Sheffield, UK

**Key message:** The cost-effective use of mAbs at the point of infection confirmation requires careful selection of patients according to their risk of hospitalisation and mortality. The value of the mAbs is a function of age, seropositivity status, immune system status, and presence of comorbidities, and assumptions related to long COVID syndrome.

## Introduction and objectives

Evidence is emerging on the effectiveness of novel neutralizing monoclonal antibodies (mAbs) for the treatment of COVID-19 in non-hospitalised patients.

The UK Department of Health and Social Care (DHSC) asked the National Institute for Health and Care Excellence (NICE) and the Decision Support Unit (DSU) to conduct rapid early economic evaluations for the use of mAbs for the treatment of COVID-19 in non-hospitalised patients to identify the key drivers when assessing their cost effectiveness, prior to the final results from ongoing pivotal trials that are currently being conducted, becoming available and assessed.

This study aims at estimating the additional costs and benefits associated with mAbs when compared to standard care (SC), and identifying the key determinants of their relative cost-effectiveness in different subgroups. SC comprises self-isolation and advice on management of symptoms for patients at home.

## Methods

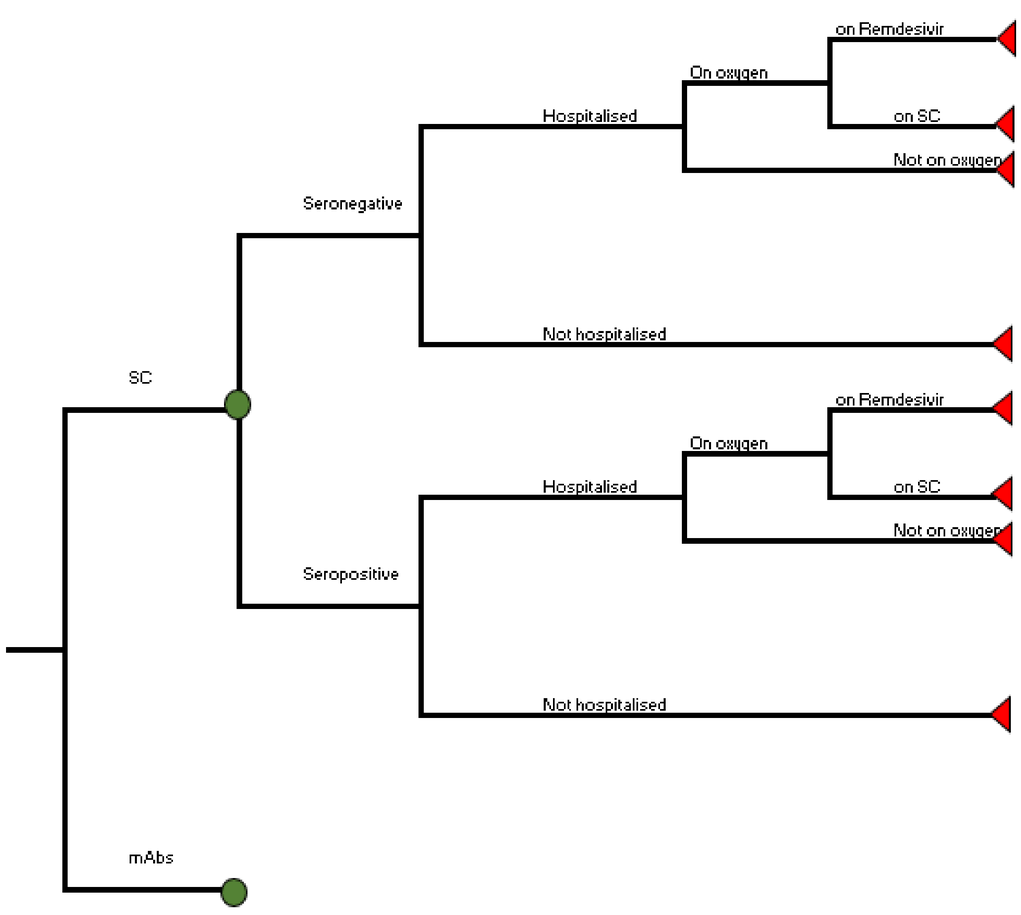
A decision model was constructed to compare mAbs, administered as a single infusion, as an adjunct to SC compared to SC alone in patients with PCR confirmed COVID-19.

Patients requiring hospitalisation may receive oxygen or ventilation support of varying intensities and remdesivir according to UK guidance in place at the time of analysis.

A decision tree model represents the pathway for patient up to their initial hospitalisation followed by a partitioned survival model (PartSM) to calculate hospitalised consequences[1].

People with confirmed COVID-19 entering the model are assessed as subgroups defined by their age, antibody status and immune system status.

## Figure 1: Decision Tree model




Health service costs and quality adjusted life years were calculated. Treatment effects were largely drawn from the REGN-COV 2067 trial[2].

**Figure 1** shows the decision tree used to decide hospitalisation outcomes for the first 14 days after testing positive for COVID-19, whereas **Figure 2** shows the parametric curves and assumptions used for the PartSM to model the rest of patient's life.

## Results

mAbs are more likely to represent a cost-effective use of resources in seronegative patients, with the ICER above typical thresholds in those who are seropositive (with a lower risk of hospitalisation and in-hospital mortality).

The relationship between cost effectiveness and age is non-monotonic. Increasing risk from COVID-19 infection with age is offset by shorter life expectancy and quality of life with increasing age. This turning point occurs around 80 years of age.

Patients with older age, and weakened immune system gained the most in terms of relative QALY gained. This is because their risk of hospitalisation and hospital mortality is greater.

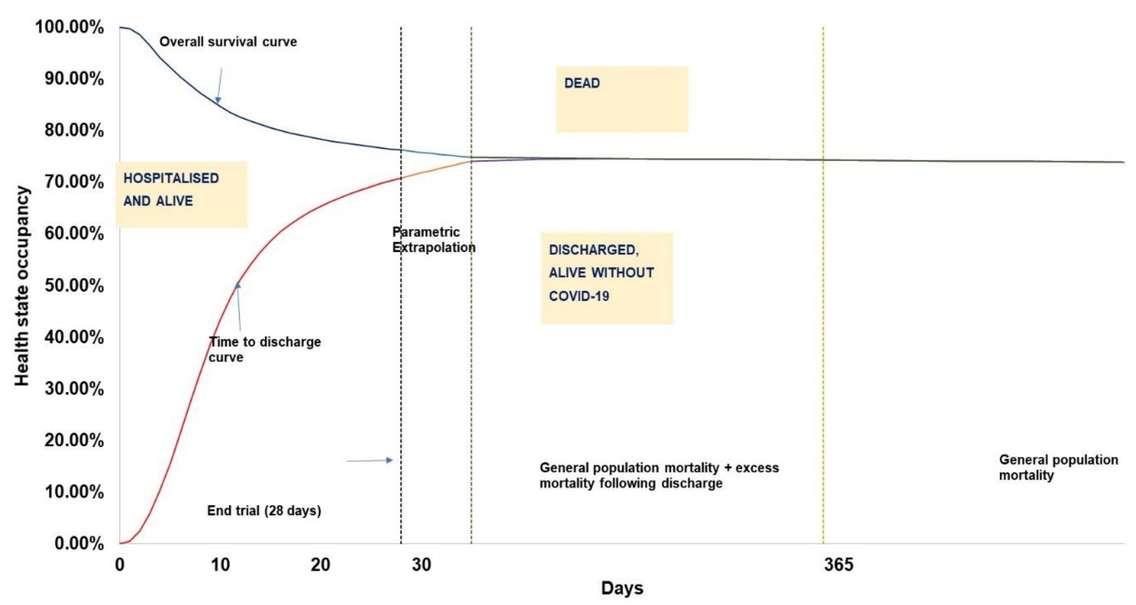
## Discussion

The cost-effectiveness of these technologies is closely linked to the population considered, even before taking account of their relative effectiveness.

The key determinants for their cost-effectiveness were (i) the risk of hospitalisation, (ii) the risk of hospital mortality (and whether patients start on oxygen or not) and (iii) general assumptions around the long-term prognosis of patients (in terms of survival and quality of life).

Limitations of the analysis include: (i) Rapidly changing environment of COVID-19 and appearance of new variants; (ii) Patients with a weakened immune system are likely benefit the most from these technologies. However, they represent a very heterogeneous group of patients in terms of prognosis; (iii) If these technologies are given following results from a positive lateral flow test, their cost-effectiveness is likely to deteriorate as these technologies could be given to individuals without the disease (i.e. false positives), incurring high costs with no benefits.

## Figure 2: Partitioned Survival model




**References:** (1) Rafia R, Martyn-St James M, Harnan S, Metry A, Hamilton J, Wailoo A. A Cost-Effectiveness Analysis of Remdesivir for the Treatment of Hospitalized Patients With COVID-19 in England and Wales. Value Health. 2022 Feb 20:S1098-3015(22)00044-4. doi: 10.1016/j.jval.2021.12.015; (2) Weinreich DM Sivapalasingam S, Norton T, et al. REGEN-COV Antibody Cocktail Clinical Outcomes Study in Covid-19Outpatients. 2021. Available at: https://www.medrxiv.org/content/10.1101/2021.05.19.21257469v2.full.pdf (Accessed 21 April 2022).

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