TCS/20/04 - Rapid Diagnosis of bacterial co-infection and antimicrobial resistance in patients with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection.

Although COVID-19 is caused by a virus, the Scottish Antimicrobial Prescribing Group and international bodies have recommended that patients with confirmed COVID-19 pneumonia should receive antibiotic treatment because of the risk that patients could have bacterial infection at the same time. This is based on past experience with influenza where a large proportion of the morbidity and mortality was caused by bacterial co-infection. As we are so early in the COVID-19 pandemic we do not know whether patients have bacterial co-infection and therefore do not know how to treat this. Studies in China suggest a high rate of bacterial detection using culture. Current methods to diagnose bacterial infections are poorly sensitive and take several days to provide results, meaning that broad-spectrum antibiotics must be prescribed. Developing rapid methods to diagnose infections and antibiotic resistance is a national priority. PCR methods are more sensitive compared to culture and nanopore sequencing using a device called the MinION can rapidly identify the presence of bacteria and antibiotic resistance through gene sequencing within 6 hours from patient sputum(phlegm) samples. These technologies have not been evaluated in patients with COVID-19. In this study we will test the ability of PCR and nanopore technology to rapidly diagnose co-infection and resistance in patients with COVID-19 pneumonia. This study will initially test the accuracy and clinical utility of the test in 200 patients with the goal of rapidly establishing which bacterial species are present and their associated resistance. This data will directly inform national prescribing policies regarding antibiotics.