

Successful Adoption of the New Normal in Biobanking

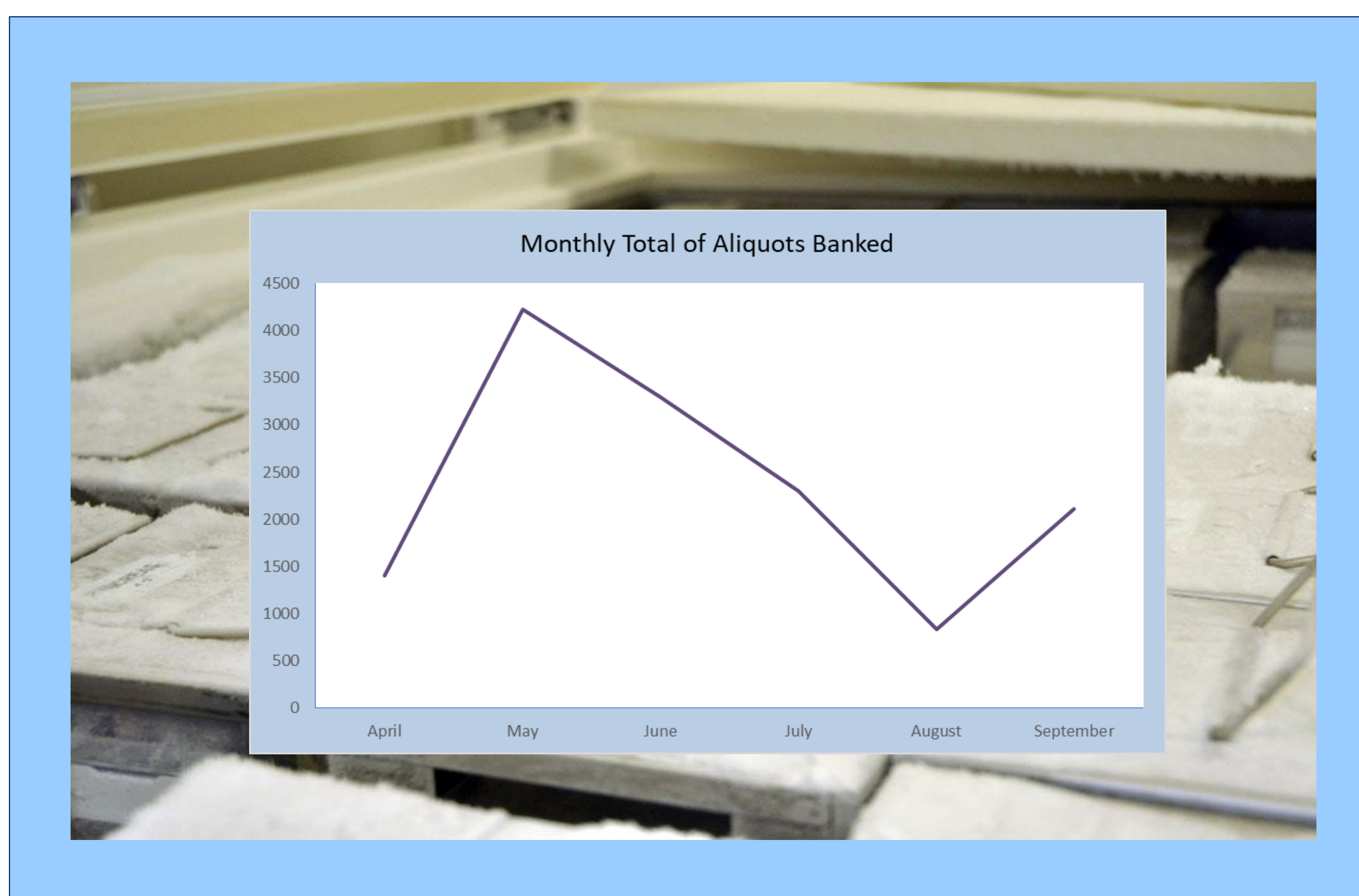
The NHS GG&C Biorepository has worked successfully over the past 6 months to adapt its routine working practices and tissue collections to support multiple local and national research studies and clinical trials into COVID19. As part of this process we have established a large Biobank of samples from COVID19 positive patients which will be available to support continued investigations into COVID19 and other SARs-CoV.

Below we describe how we have achieved this collection and give examples of the research we have provisioned samples for so far. We also describe how they have been instrumental in furthering researchers and clinicians understanding of the progression of COVID19.

Introduction

The NHS GG&C Biorepository, as one of the four NHS Research Scotland Biorepositories, is a resource which provides human tissue for research from many disease areas. Each year we provide researchers with A tissue samples and around B whole bloods.

In March, and in response to the need for samples for COVID19 research our Biorepository went from collecting 3 to 4 blood samples a week to collecting over 1000 blood samples a week for a 6 month period. Five hundred of these weekly samples were exclusively banked for a specific project looking at community prevalence of corona virus disease (Case Study 1) with the remaining samples banked for use in novel COVID19 related research studies. While many of the UK workforce were furloughed, and some of our own staff were constrained by school closures, our lab team still sourced and collected surplus blood from Biochemistry and Haematology every day.



This was a coordinated effort. There was a dynamic change in the way the Biorepository worked and we had to quickly adapt our working practices to include social distancing while still being able to identify and collect all appropriate blood samples. Relevant clinical data was also collected through our NHS Safe Haven and a LIMS system was quickly developed to enable quick logging and tracking of the samples.

The majority of studies supported applied directly to the Biorepository to access samples under our Tissue Bank ethics (16/WS/0207) with applications reviewed and approved by our Biorepository Management Group. For studies with project specific ethics we manage receipt, processing and storage as per their protocol requirements.

Conclusions

Up to mid-September 2020 we have banked ~43,000 aliquots of blood samples from nearly 3,000 COVID19 patients. So far these have been utilised in 12 research studies and to support 3 CSO funded studies/trials into Covid19.

As demand grew, we also managed to collect 1176 sputum samples and 45 urine samples through liaising with local Microbiology.

As highlighted through our examples results obtained with samples from or managed by NHSGGC Biorepository have been used to inform Scottish Government in their management of this pandemic and are also being used to inform design and adaptation of therapies and management pathways for COVID19 patients.

Through our generic delegated REC authority as a Research Tissue Bank we have be able to facilitate collection and storage of samples quickly and efficiently from a large cohort of patients with a large variety of characteristics. This range of samples from patients with different ages, gender, regional, social and economic backgrounds gives a vast amount of data that is vital in informing our policies and procedures on how to manage treatment and recovery of COVID19 patients. They can also guide on how society can adapt and move forward into the "New Normal" era of living and working alongside COVID19 and other SARs-CoV.

Case Studies



Case study 1:

From the end of March to the middle of September 2020 we provided this study with over 17,000 serum samples. This study brings together Public Health Scotland's National Serology Surveillance programme with NHS and the MRC University of Glasgow Centre for Virus Research. Its results, combined with other samples obtained from across Scotland, are being used to advise Scottish Government in its management of COVID19.

CISCO-19 - Cardiovascular and Pulmonary Imaging in SARS Coronavirus disease-19 study:¹

This CSO funded study aims to provide detailed insights into cardiovascular and multisystem involvement of COVID-19. The study will inform the rationale and design of novel therapeutic and management strategies for affected patients. NHSGGC Biorepository are coordinating the receipt, processing and storage of bloods taken through the course of this trial.

COVID-19 Genomics UK (COG-UK) consortium:

Samples have been provided to support this pan-UK collaboration between the four UK Public Health Agencies, multiple regional University hubs, and large sequencing centres such as the Wellcome Sanger Institute²

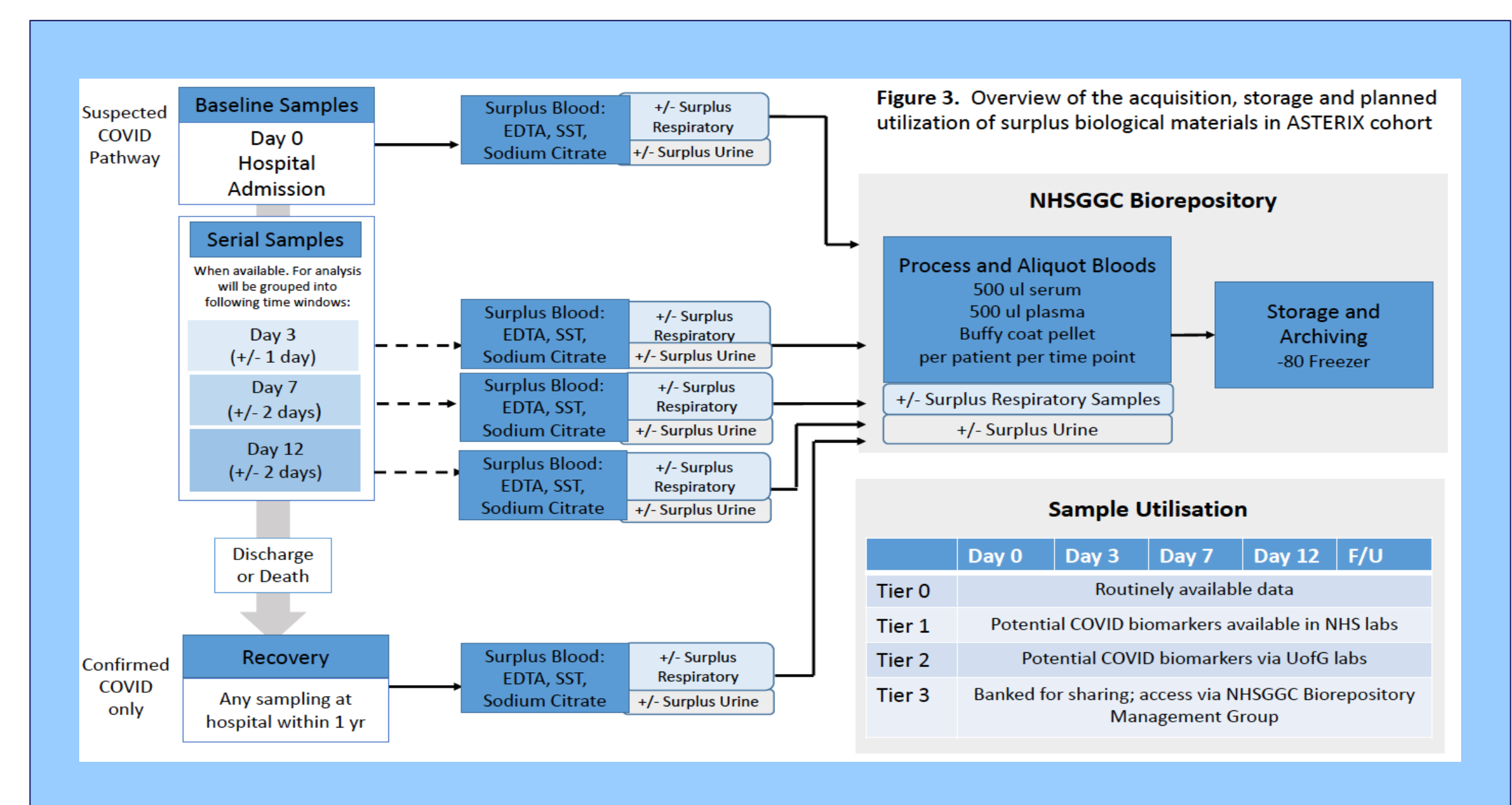


Fig.1

ASTERIX Adaptive stratification of COVID19 to facilitate Endotype-directed Intervention Studies:

The aim of the ASTERIX study is to define disease endotypes, based on baseline biological signatures associated with COVID-19 pneumonia, development of respiratory failure and death, which could be targeted in future trials.

This is one of the largest studies NHSGGC Biorepository are supporting with >6,000 samples of blood, urine and respiratory secretions collected and banked during the first wave of the COVID19 pandemic in Glasgow.

The cohort is organised into Tiers 0, 1 & 2, with each tier having an increasing number of samples available for downstream translational research. All tiers have the same associated comprehensive clinical data, including comorbidity, ethnicity, blood results, imaging, prescription data and outcomes, including critical care support and survival. See Fig. 1.

Data and banked samples will be used to develop endotypes (biological signatures derived from statistical models) associated with progression to key clinical outcomes. This information will be used to identify high-risk cohorts that could be targeted in future studies testing suitable interventions, as directed by the content of each signature.

References:

- 1.The Chief Scientist Office Cardiovascular and Pulmonary Imaging in SARS Coronavirus disease-19 (CISCO-19) study <https://doi.org/10.1093/cvr/cvaa209>
2. <https://www.cogconsortium.uk/news/>
- 3.Genomic Epidemiology of SARS-CoV-2 spread in Scotland highlights the role of European Travel in COVID-19 emergence doi: <https://doi.org/10.1101/2020.06.08.20124834>
- 4.<https://www.shil.co.uk/news-and-events/news/rapid-antibody-test-to-support-the-fight-against-covid-19>