2023

‘A Most Equitable Drug’: How the Clinical Studies of Convalescent Plasma as a Treatment for SARS-CoV-2 Might Usefully Inform Post-Pandemic Public Sector Approaches to Drug Development

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Word count: 7209

Abstract

Interventional clinical studies of convalescent plasma to treat COVID-19 were predominantly funded and led by public sector actors, including blood services operators. We aimed to analyze the processes of clinical studies of convalescent plasma to understand alternatives to pharmaceutical industry biopharmaceutical research and development, particularly where public sector actors play a dominant role. We conducted a qualitative, critical case study of purposively sampled prominent and impactful clinical studies of convalescent plasma during 2020-2021. We found that studies were mobilized and scaled at record pace due to well-connected investigators who engaged in widespread sharing of clinical trials resources, regulatory facilitators, and public funding and infrastructure. Clinical studies also served to build public sector and health system capacity and generate clinical trials and blood services infrastructure. Key insights from these studies can be used to enhance the likelihood of success of future models of biopharmaceutical production, designed in the service of ensuring equitable access to biopharmaceuticals, should the political will and financing to support such models someday follow.

Keywords

Convalescent plasma; randomized controlled trials; clinical trials; public sector; innovation; pharmaceutical industry

The world over, the COVID-19 pandemic has wrought uneven sickness and death driven, in large measure, by multiple forms and sources of inequity. In line with Louis Pasteur's prescient warning centuries ago—"the microbe is nothing, its terrain everything"—access to SARS-CoV-2 screening and diagnostic testing tools, antivirals, and vaccines has been delayed and limited in low- and middle-income countries for much of the pandemic. Foreseeing this eventuality, many called for systemic change to laws and systems governing biopharmaceutical knowledge production at the outset of the pandemic, which included demands for transparency around scientific methods, data, and clinical trial costs, intellectual property waivers, and public sector leadership in biopharmaceutical research, development, and access.[1] However, more than 2 years into the COVID-19 pandemic, excepting limited waivers to intellectual property rights related to COVID-19 vaccines, none of the proposed changes have been implemented.

One potential medicine, identified even before the pandemic was officially declared, appeared to offer a set of different possibilities than other experimental leads in the hands of the multinational pharmaceutical industry: convalescent plasma. Unlike other experimental options controlled by those companies, convalescent plasma could be sourced directly from people who had been infected by, and recovered from, COVID-19. As well, convalescent plasma itself is not patentable subject matter (although a host of scientific processes used, for example, to separate out immunoglobulin from other proteins within plasma,[2] have been patented), enhancing researchers' freedom to operate without immediate risk of legal reprisals. In principle, an available human supply, complicated by fewer intellectual property related barriers, made convalescent plasma a plausible, more equitable target for investigation and development even though scientific understanding of how and to what extent convalescent plasma conferred immune protection against any pathogen, let alone SARS-CoV-2, was essentially non-existent in early 2020.[3]

Two years into the pandemic, the World Health Organization (WHO) [4] and the National Institutes of Health (NIH)[5] among others, recommended against the use of convalescent plasma among non-severe, immunocompetent hospitalized patients, judging that the benefits did not outweigh the costs of the therapy. The story of convalescent plasma during COVID-19 nevertheless has much to tell us: trusted networks, comprised of government-funded trialists, clinicians, and regulators mobilized at unprecedented speed and, with the aid of public funding and infrastructure, implemented these clinical trials on a national scale, including in lower- and middle-income countries. Drawing on the field of pharmaceutical studies,[6] we conducted a critical, qualitative study of clinical trials seeking to understand the effectiveness of convalescent plasma against SARS-CoV-2 with the aim of understanding the range of approaches to biopharmaceutical research and development, and particularly approaches where public sector actors play a dominant role.

Currently, the majority of pharmaceutical clinical trials globally are funded, conducted, and disseminated by for-profit industry.[7] The involvement of pharmaceutical companies in industry-sponsored trials varies from the free provision of study drugs to running the entire trial and publishing the results without involvement of academic researchers.[8] Pharmaceutical industry sponsorship of clinical trials is associated with biases in the scientific literature, including the tendency to publish favorable results and to suppress negative findings, safety risks stemming from lack of access to proprietary data, inequities in access to patented treatments, and the unethical treatment of research participants.[9] The existing system of biopharmaceutical innovation is also critiqued for research agenda biases, which result in unmet medical and public health need (e.g. as evidenced by the high proportion of me-too drugs that offer only incremental innovation), inefficient collaboration due to protectionist practices and secrecy arising from the current intellectual property

regime, and high drug pricing which creates barriers to medicines access and results in limited re-investment into innovation.[10]

Scholars have thus called for a rethinking of the current status quo for drug development,[11] pointing to the essential and underrecognized role the public sector already plays in the funding, conduct, and implementation of clinical trials.[12] To address current public health challenges, scholars argue for new policy approaches to innovation that envision a leadership role for the public sector involving research direction-setting to address public health challenges, public sector capacity building to enable dynamic collaboration with the private sector that genuinely serves the public interest, and a re-distribution of the risks and rewards associated with innovation.[13]

The global COVID-19 pandemic prompted an unprecedented mobilization of public and private resources for clinical research into the safety and effectiveness of treatments and vaccines. Using publicly available documentary sources, we conducted an in-depth analysis of prominent clinical trials of convalescent plasma and hyperimmune immunoglobulin for the treatment of SARS-CoV-2 that took place globally during 2020-2021. We sought to understand the respective roles and interests of public, academic, and private entities within the context of a global market in clinical trials, their inter-relationships, and the implications for health equity and research integrity and to analyze these configurations as a means of identifying promises and challenges of alternative models of biopharmaceutical research and development.

A critical case study of public sector innovation

We conducted a qualitative, critical case study[14] of prominent clinical studies of convalescent plasma for the treatment of COVID-19, collecting and analyzing publicly available documents detailing the processes related to the design, approval, conduct and dissemination of the studies. We employed a critical interpretive approach to examine

biomedical and bioscience regulation which aims to consider the meaning of practices and processes related to decision-making, governance, and allocation of resources that take place across clinical, regulatory, and scientific domains.[15] The methods are reported according to the COREQ guidelines[16] (Supplementary File 1).

In the case of clinical studies evaluating convalescent plasma for the treatment of COVID-19, the recruitment of convalescent plasma donors often meant the integral involvement of a highly regulated, publicly funded, blood service. The involvement of blood services organizations in convalescent plasma trials is in some ways analogous to the role of the pharmaceutical company in a clinical drug trial—primarily in that they provided the drug and/or source material (convalescent plasma), but also extending to involvement in clinical trial design, participant recruitment, data collection and analysis, and dissemination. Thus, the efforts to evaluate the safety and effectiveness of convalescent plasma as a treatment for COVID-19 pandemic present a unique and timely case to understand the role of public institutions amid the politics and economics of drug development.[17] We approached analysis of this collection of prominent trials as a form of mission-driven public sector innovation[18] with the aim of offering insights into the nature, value, facilitators, and challenges associated with public sector-led clinical trials.

Sampling and data sources

We purposively sampled studies of convalescent plasma that were prominent, impactful, and public facing as they were most likely to have relevant and publicly available documents and could provide the most information-rich illustrations of the range of convalescent plasma studies for analysis. We selected studies that had an online presence in the form of a study website, clinical trials registration, or social media activity; that had demonstrable impact defined as publications (including preprints), inclusion or reference in clinical practice guidelines, and/or citation by other trials; and were prominent in terms of

media coverage, social media activity, and/or clinical or scientific impact. We also aimed to sample studies that reflected the range of study designs, geographic locations, sponsoring entities, and blood service involvement. To identify the sampling frame, we searched for "convalescent plasma" and "hyperimmune immunoglobulin" study records within ClinicalTrials.gov and the Cochrane COVID-19 database and categorized records returned by design, region, size, enrolment status, and sponsor type. We continued to sample studies until we found frequent cross-references to the previously sampled studies through citations, collective inclusion in systematic reviews and meta-analyses, or mentions in media reports, and determined saturation at this point.

For each study identified we conducted targeted, structured, purposive Google searches, beginning with a search of all ethics and regulatory applications and approvals, study websites, trial protocols, preprints, and publications. Then, we sought ancillary documents related to these including editorials, participant-facing materials (e.g., recruitment posters, consent forms), and first-person accounts of the study (e.g., author blogs) to deepen our analysis of the relationships among key clinical trial stakeholders. Finally, we conducted systematic Google searches with the following: [study name] and [study country] and "trial" and "convalescent plasma." Using this search strategy, we searched Google month by month, restricting hits by date range beginning March 1, 2020. We also used advanced search functions within Google to restrict to geographical region (i.e., Argentina) to sample in a more targeted way. We purposively sampled articles (including blogs, news, journal articles) that pointed to relevant documents, were highly information rich and returned new information, or answered particularly lines of inquiry (as laid out in the data extraction form). We stopped sampling when articles returned by the Google search returned no new information or consistently cross referenced previously sampled documents. All documents were saved as PDFs and catalogued in Excel and EndNote.

Data collection and analysis

Data were analyzed using qualitative, interpretive content analysis.[19] This method involves a systemic classification process of labelling the text using thematic codes and then identifying themes and patterns within and across thematic codes.[20] We created a data abstraction instrument consisting of a series of open-ended questions based on the study aims, background literature, and theoretical perspectives on the political economy of drug development (Supplementary File 2). For each sampled trial, four coders working as pairs (QG, CC, RA, KH) used the sampled documents to answer the open-ended questions, including identifying and describing the key entities involved in funding, planning, conducting, and disseminating the trial and their interrelationships and describing salient legal, ethical, and equity issues such as how convalescent plasma was sourced and how participants and donors were recruited and consented.

Through multiple team meetings, we used these data abstraction forms to develop a thematic coding scheme. QG and RA piloted the coding scheme on 10% of the sample and finalized the coding scheme as three groups of codes: the "who" (e.g., blood services, funders), the "what" (e.g., participant recruitment, donor recruitment), and the "how" (e.g., open science, regulatory facilitators/barriers). RA and QG coded all sampled documents independently using NVivo 11, resolving discrepancies through discussion. QG and KH then wrote interpretive memos based on the data compiled under each code to generate overarching themes (e.g. equity-driven approaches, reliance on public infrastructure, primacy of relationships) and comparative analyses. To report on each theme, we then selected and present exemplars, which are particularly information-rich and strong examples of the theme in narrative form, which serve to illustrate the themes in ways that captures rich contextual detail, commonalities, nuance, and variability in experiences across studies.[21]

The promises and politics of convalescent plasma

We included 245 documents from 8 clinical studies in 6 countries (Table 1). The studies, one large-scale, prospective observational study and 7 randomized controlled trials (RCTs), spanned Canada, the United States, Argentina, the United Kingdom, India, and China. These documents included: study protocols and registrations; press releases and media accounts; first-person accounts and journalistic retrospectives; and finally, scientific reports. In the following text, we cite illustrative sampled documents and provide a full catalogue in Supplementary File 3.

Inspired by its use in previous pandemics, in late January 2020, hospitals in Wuhan, China, where the SARS-CoV-2 virus was first detected, began collecting convalescent plasma from individuals recovered from COVID-19 and published the promising outcomes as case studies.[22] Given limited understandings of how convalescent plasma worked, how to select for donors, how to ensure that plasma donation had sufficient quantities of precise therapeutic components (and what these were), or which patients might benefit,[23] the pandemic represented an opportunity to develop a robust body of evidence supporting this historically significant treatment. Building off these early case studies, scientists at the Institute of Blood Transfusion at the Chinese Academy of Medical Sciences (a public institution and the study's funder) designed and launched the first RCT (ChiCTR2000029757) of convalescent plasma on February 14, 2020 and helped launch a pilot program through the Wuhan Blood Centre to recruit donors.[24] The investigators stopped the trial early on March 27, 2020, following an entire week where no new cases of COVID-19 were reported in Wuhan, finding no difference between those receiving convalescent plasma and those who did not.[25]

However, given that the trial was underpowered, and participants received treatment at a late disease stage (at least 14 days after the onset of symptoms),[26] the questions of the

effectiveness and clinical utility of convalescent plasma remained open. Interest in convalescent plasma soon caught on globally, and by May 1st, 2020, there were 64 planned and ongoing studies of convalescent plasma in 22 countries;[27] by March 2021, systematic reviewers identified 113 completed and ongoing studies of convalescent plasma.[28]

In our purposive sample, the 8 studies were larger and higher-profile in terms of high-impact publication, influence on national and international clinical guidelines, and media attention per our inclusion criteria (Table 1). Among these prominent and impactful trials, convalescent plasma was collected and tested for two main purposes and involved two different, but often overlapping groups of stakeholders: 1) licensed, publicly-funded and often nationally-coordinated blood services worked with hospitals, academic researchers, and government funders to plasma collect plasma from donors recovered from COVID-19 for direct transfusion (n=7/8 sampled studies, including the trial in Wuhan); and 2) the for-profit plasma therapeutics and pharmaceutical industry spearheaded the development of hyperimmune immunoglobulin, manufactured from aggregated convalescent plasma donations with high titres of SARS-CoV2 antibodies (n=1/8 sampled studies).

These sampled studies thus offered rich insights into the dynamics of nationally coordinated clinical studies led by the public sector, with the case of the trial of hyperimmune immunoglobulin offering a counterpoint. Our analysis constructed 6 themes that characterized this group of high-profile clinical studies, which collectively suggest alternative approaches to pharmaceutical industry dominance within clinical research and drug development. The themes are:

1. How research agenda-setting can contribute to equity-oriented health policies;
2. How the values underlying prioritization of clinical research affects the stewardship of health system resources and production of meaningful research results;

3. The primacy of relationship building and trusted networks for mobilizing research networks and capacity building;
4. Understanding the vital role of the public sector for clinical research funding, capacity, and infrastructure;
5. The tensions among transparency, open science, and science hype;
6. The challenges of mitigating political exploitation within public sector clinical research.

Each theme presents key tensions for equitable, accessible drug development that require future research and policy deliberation, which we pursue in the Discussion.

"A most equitable drug": When access and affordability drive research agendas

Interest in convalescent plasma rose because of its perceived availability, accessibility, and affordability, as this therapy could be sourced from among countries' own populations. Proponents characterized convalescent plasma as an equitable, stop-gap measure while vaccines and other treatments were under development. For example, during early 2020, two influential scientists, Arturo Casadevall, a professor of immunology at Johns Hopkins University, and Liise-anne Pirofski, the Chief of Infections Disease at the Albert Einstein College of Medicine published high-profile op-eds advocating the promise of convalescent plasma as a rapidly scalable and accessible treatment for COVID-19, and calling for controlled clinical trials to determine efficacy.[29] They also seeded the idea of convalescent plasma programs to ramp up supply, emphasizing the need for key infrastructural elements to ensure recruitment of donors, safety, and quality assurance in donation collection, and regulatory oversight.[30]

The thinking around convalescent plasma as a tried and true therapy echoed among scientists worldwide who noted not only its relative safety and availability, but also, unlike other vaccines or treatments, its relative accessibility and affordability.[31] For example,

scientists at the Indian Council of Medical Research (ICMR) examining promising treatments in early April 2020 characterized convalescent plasma as, "a century old friend, tried and tested every time humanity faced a dangerous pathogen."[32] They decided to pursue a trial of convalescent plasma because "unlike all other new treatments which were in uncertain supply, it could be the most equitable drug."[33]

Convalescent plasma thus emerged as a promising therapy, but one without a commercial manufacturer, avoiding issues and complex negotiations around acquisition, pricing, and reliable supply. For example, the United Kingdom (UK) Department of Health and Social Care tasked the therapeutics subcommittee of the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG), a standing expert committee,

> Please will the independent scientists help us come up with a shortlist of compounds it would be sensible to evaluate if possible during the early phases of a UK pandemic. We need a quick answer from a simple trial such that we can then turn our attention to using successful therapies in a widespread way.[34]

The following week, the NERVTAG therapeutics subcommittee made recommendations, prioritizing drugs for acquisition by the Department of Health and Social Care which were currently licensed, widely available, with good safety profiles, and giving weight to therapies with stronger levels of evidence of human efficacy.[35] Among several therapies, they recommended convalescent plasma or hyperimmune serum. While convalescent plasma was not currently available, the group noted the ability and readiness of the publicly funded blood service through the National Health Service.[36]

Through crafting a time-sensitive pandemic response, clinical trial processes located within the public sector could prioritize equity-oriented considerations such as accessibility, availability, and affordability. Further, promising therapies could also be prioritized in the context of wider public health infrastructure such as blood services capacity.

Gaining priority status: How values drove the research approach

In the early weeks of the pandemic, governments sought to rapidly prioritize efforts to identify and evaluate treatments to streamline and conserve health system resources. However, different values appeared to guide the policy choices among study designs and the decision to prioritize particular studies. Studies of convalescent plasma thus gained priority status for different reasons – the generation of clear evidence of effectiveness in some cases and access to convalescent plasma as a treatment in others – with crucial implications for the stewardship of health system resources under pandemic conditions and the generation of meaningful research results that could guide health policies.

Prioritizing clinical trials. Many governments restricted access to convalescent plasma therapy to participants of clinical trials with the aim of generating clear evidence of safety and effectiveness. These decisions were guided by recognition that many studies conducted during previous pandemics such as SARS were underrecruited and failed to deliver meaningful results.[37] For example, at the first meeting of the NERVTAG therapeutics subcommittee, the minutes reflected the "strong view" that "the primacy and importance of getting a meaningful result from clinical trials is the number 1 priority" as opposed to considering non-clinical trial, salvage, compassionate, or other unlicensed use of therapeutics.[38] Among the three key national trials that the National Institute of Health Research (NIHR) and National Health Service gave priority status were REMAP-CAP (the Randomised, Embedded, Multifactorial, Adaptive Platform trial for critically ill patients) and the RECOVERY trial (Randomised evaluation of Covid-19 therapy). Subcommittee meeting minutes reflected the desire to test therapies "with simple, pragmatic design which can be started, recruited to and analysed quickly," to "design whatever we can make fit best," that "all parties hold fire on their own research projects and get behind central initiatives" and that they had "<6 weeks."[39] Similarly in Argentina, on the 18th of April 2020 the Ministry of

Health of the Nation launched a new Single Registry of Clinical Trials to centralize and create a clearinghouse for sharing results among all trials in both the public and private sphere.[40]

Prioritizing access. The US favored a different set of priorities, which included maximizing access to convalescent plasma as a therapy and establishing a safety profile. The US Food and Drug Administration (FDA) thus permitted the use of convalescent plasma through an Emergency Access Program, in addition to use within clinical trials.[41] The primary aims of the Emergency Access Program, as a large-scale observational study, were to provide access and establish a safety profile among hospitalized patients with severe or life-threatening COVID-19, though it also aimed to assess a dose response.[42] With the priority of access, an additional goal of the Emergency Access Program was to establish, standardize, and qualify the supply chain for convalescent plasma into the US, in line with its promise as a "rapidly available" treatment.[43] The investigators, a priori, intended to create a control comparator group within the context of the Emergency Access Program [44] but despite planning trials, sites opted to enroll as part of the observational study and did not randomize participants into treatment and control arms as the "vast majority" of study sites "had no infrastructure or experience with clinical trials, and wouldn't be expected to run them."[45] By August 2020, the Mayo Clinic Emergency Access Program had reached massive proportions, enrolling 2,232 sites, 13,019 physicians, and 105,717 patients, and had conducted 94,287 transfusions.[46]

Sharing within trusted networks: The importance of being connected

The convalescent plasma trials were designed, approved, and implemented at unprecedented speed, sometimes going from design to first enrollment in a matter of weeks (see Table 2 for a timeline of events). Investigators credited the importance of global networks of colleagues and friends in facilitating this mobilization, which resulted in the

rapid and wide sharing of clinical trials resources including various protocols, which were adapted to local contexts.

Following publication of their op-eds, Casadevall and Pirofski disseminated these ideas through global networks of friends and collaborators. In the US, on March 21st, Michael Joyner, a physiologist and anesthesiologist with an NIH-funded lab focused on exercise physiology at the Mayo Clinic, and self-identified friend of Arturo Casadevall, organized a conference call of physicians and scientists; this was the first meeting of the National Convalescent Plasma Project (CCPP19):

> A group of colleagues who were already connected through friendships and common interests, instantly recognized the promise and importance of examining whether this mode of treatment might work in COVID-19 and reached out to other colleagues in virology, transfusion medicine, epidemiology, clinical trials and several other disciplines to move these ideas forward.[47]

Dr. Casadevall went on to chair the CCPP19, while Drs. Joyner and Pirofski served as members of the 7-person leadership team. Dr. Casadevall also helped to seed the idea of convalescent plasma internationally. In the early weeks of the pandemic, he worked with colleagues at Johns Hopkins to connect with clinicians, researchers, and regulators around the world to develop generic treatment, donation, ethics, and regulatory protocols that could be adapted to local settings "in a marathon of selfless, round-the-clock work toward an urgent common goal—to overwhelm and crush the COVID-19 virus."[48]

The generic convalescent plasma trial protocol reached Argentina, which had a high burden of COVID-19 disease, an early first wave,[49] and a specific historical experience with convalescent plasma in the 1970s as an effective treatment for Argentine Hemorrhagic Fever.[50] Laura Bover, an Argentine-American researcher and Director of the Monoclonal Antibodies Laboratory of the MD Anderson Center of the University of Texas, contacted her

"network of friends in Argentina" to discuss the idea of a trial after witnessing the implementation of the protocol in the US.[51] This network of friends then grew into a team of more than 60 Argentine and Argentine-American researchers who organized under the name CPC-19 (Convalescent Plasma COVID-19), most of whom were affiliated with CONICET, the independent, publicly funded National Council for Scientific and Technical Research, who worked to tailor the generic convalescent plasma donation and transfusion protocols and templates for informed consent, with the hope that protocols could be implemented across Argentina.[52]

Investigators of the sampled trials were highly connected individuals whose networks also included health products regulators, health system administrators, and institutional review board leadership, who facilitated review processes, priority status, and trial recruitment efforts. For example, in the UK, the RECOVERY study, whose PI also chaired NERVTAG, gained priority status (as an Urgent Public Health Research study), receiving priority consideration by the Health Research Authority and Medicines and Healthcare products Regulatory Authority and the full support of the National Health Service leadership.[53] Consequently, the RECOVERY study had gone from ideation to enrolment in less than two weeks and enrolled over 7500 patients in the first few weeks.[54] By July 2020, approximately 15% of all hospitalized patients with COVID-19 in the UK were enrolled in the RECOVERY trial[55] and by August, RECOVERY had become the 'dominant' trial in the UK. The RECOVERY platform was then expanded to form "the principal vehicle for all publicly funded phase II studies"[56] in the UK.

A public investment: Public funding, capacity building, and generating infrastructure

The efforts to mobilize, implement, and scale studies of convalescent plasma relied almost exclusively on public funding and publicly funded infrastructure (Table 1). While governments took interest in transfused convalescent plasma as a potential therapy for

COVID-19, the pharmaceutical industry, in parallel, sought to investigate convalescent plasma as source material for drug development. However, despite industry initiative, the clinical trial of H-IgG was also ultimately reliant on public funding, and publicly funded infrastructure. For example, Takeda, a pharmaceutical company with a line of plasma-derived products and a network of for-profit plasma collection centers in the US and Europe, announced the development of an anti-SARS-CoV-2 polyclonal hyperimmune globulin (H-IgG) to treat high-risk individuals with COVID-19[57] and a partnership with "global plasma leaders," including the pharmaceutical companies and fractionators designed to increase plasma supply.[58] A key impetus for the collaboration was the need to collaborate with public and scientific actors. The Executive VP and Head of Research at CSL Behring explained,

> In addition to pooling industry resources, we will also collaborate with government and academic efforts as a single alliance whenever we can, including important activities like clinical trials. This will make it more efficient in these hectic times for these stakeholders as well.[59]

On May 7th, 2020, the company leads christened the alliance the "CoVIg-19 Plasma Alliance," announcing expanded industry membership and a collaboration with the US National Institutes of Health (NIH) to test "the safety, tolerability and efficacy of the hyperimmune therapy in adult patients with COVID-19."[60] The clinical trial was scheduled to start in the summer of 2020 and would form the basis for a regulatory approval if successful. Sponsored by the National Institute of Allergy and Infectious Diseases,[61] the Inpatient Treatment with Anti-Coronavirus Immunoglobulin (ITAC) phase 3 clinical trial began enrolling patients in October 2020 through the INSIGHT Network, a global, NIH-funded clinical trials infrastructure originally designed to conduct trials for treatments of HIV and subsequently, influenza.[62]

Clinical trials infrastructure. The speed at which governments hoped to identify safe and effective treatments for COVID-19 meant that the studies given priority status and the investigators chosen to lead these efforts were highly established in terms of clinical trials capacity, funding, and connections within the policy, academic, and clinical communities. The existence of publicly funded clinical trials infrastructure enabled the rapid pivoting of existing studies and demonstrated the potential to deliver relatively rapid and conclusive results. For example, the UK NERVTAG therapeutics subcommittee identified REMAP-CAP, a randomized, factorial platform trial examining therapies for people admitted to critical care with pneumonia as having the extensive experience necessary to design, conduct, and report clinical trials that enroll patients who are severely ill[63] and an existing global research infrastructure that facilitated acquisition of approvals, ethics review, and research implementation.[64]

The PLACID trial in India also provided the impetus for national capacity-building around clinical trials. Following protocol approval, the ICMR launched a call for letters of intent for participation as trial sites and received 99 applications.[65] The lead investigators explained that their instinct was to implement the study protocol at a "few elite centres of repute," but questioned

> Would it be equitable to restrict clinical trials, an important vehicle for providing access to treatment, to a few hospitals? Would it represent the reality of India, which encompasses both the urbanscapes of Delhi, as well as the rural villages of Bihar?[66]

Thus, the study authors opened recruitment to "every hospital that had the requisite infrastructure and agreed to provide treatment free of cost to all of the participants in the trial."[67] Between April 22 and July 14, 464 patients were admitted across 39 heterogenous trial sites with the investigators noting the pragmatic nature of their approach given that these settings likely reflected the nature of real world care in lower- and middle-income countries.

On later reflection, the PLACID trial investigators "learnt that reputed elite institutions, first world collaborations, third party organisations, or big funding are a big help if available, but they are not indispensable."[68] The inclusivity of the PLACID trial was coupled with rigorous capacity building and training efforts to ensure the integrity of data collected.

Blood services infrastructure. The injection of public funding and resources into convalescent plasma trials served to generate the development of infrastructure for clinical trials, but also public health: in this case, blood services. Among the key conditions outlined by proponents of convalescent plasma at the outset[69] was the availability of a population of plasma donors and the infrastructure to collect and test convalescent plasma donations. In countries with a national blood service, such as Canada and the UK, these institutions mobilized their marketing, outreach, and other resources to collect and distribute convalescent plasma. In countries without national blood service operators, the trialists first relied on the participating study sites to recruit from their own recovered patient population. However, the interest in convalescent plasma – both within and outside of clinical trials – sparked the development of novel blood services infrastructure. In 2020, the first plasma bank opened in New Delhi based out of the Institute of Liver and Biliary Sciences, an autonomous institute of the National Capital Territory of Delhi.[70] Similarly in Argentina, historically, blood donation was limited and most voluntary donations are familial replacement donors, not altruistic.[71] On June 26th, lawmakers advanced a bill to create a National Programme for the Donation of Blood Plasma to the Senate; the program aimed to promote donation of convalescent plasma, in particular. The legislation, enacted August 11th, declared the collection of convalescent plasma a national public interest and created a series of incentives to encourage voluntary plasma donation such as granting two days paid leave for employees in a dependent relationship, transportation facilities to and from health centers, and an official recognition as "outstanding citizens of solidarity of the Argentine republic."[72]

In contrast, the highly decentralized and eclectic blood system in the US created conditions in which key stakeholders—the Emergency Access Program and the CoVIg-19 Alliance—were in competition for donors. Joyner, the PI of the Emergency Access Program, at one point, floated a plan to coordinate efforts so that those eligible to donate convalescent plasma for transfusion could be funneled into the Emergency Access Program and those ineligible could donate for H-IgG development – however, this did not materialize.[73] Instead, to meet growing demand for source and transfusion convalescent plasma in May 2020, the Emergency Access Program, the CoVIg-19 Plasma Alliance, Grifols, and the American Association of Blood Banks joined forces through "The Fight Is In Us," a national donor recruitment campaign, with celebrity support from the National Basketball Association and Dwayne "the Rock" Johnson and funding from The Bill & Melinda Gates Foundation, the Lasker Foundation, Microsoft, and The MITRE Corporation.[74] These high profile recruitment campaigns raised the profile of convalescent plasma as a treatment, but also created a competitive market within the context of the US blood system where donors are frequently remunerated, resulting in reports of dubious recruitment practices.[75]

Transparency and science by press release

Sampled convalescent trials were characterized by a high degree of transparency, thus, we were able to analyze a wide range of study documents that were made publicly available. The transparent approach had an instrumental dimension in terms of building relationships and capacity among prospective sites and investigators. For example, the authors of the PLACID trial emphasized, above all, the primacy of relationships and a focus on capacity building, training, and respect for local health systems. They attributed this model to a grounding in trust and transparency: "As in other areas of life, generating evidence is also best done by fostering trustworthy relationships—with effective communication, clear ownership, and teamwork at their heart."[76]

Transparency around dissemination of study results, justified by the desire to impact care of people ill with COVID-19 in near real-time, were at times criticized as science by press release, due to the speed with which major policy decisions were taken based on these media releases of interim study data, without publication or sharing of trial data. Speaking about the release of preliminary results related to steroids in the RECOVERY trial, a lead investigator told *Science*, "It's very, very rare that you announce results at lunchtime, and it becomes policy and practice by tea time, and probably starts to save lives by the weekend."[77] The urgency of the pandemic crisis, the media savviness of trialists and sponsors, and rapid and highly public forms of dissemination of interim or preliminary study results brought a great deal of transparency, "global recognition" and "intense scrutiny."[78] However, public availability of de-identified patient-level data sets, analytic code, or full results often followed months or years later (Table 1), meaning that truly open science in terms of traceability or replicability was secondary to rapid knowledge mobilization.

When public support is vulnerable to political exploitation

While all science is political in that it involves normative, social processes related to prioritization, allocation of resources, and power relations, the sampled studies illustrated the vulnerabilities of public sector clinical research to political exploitation. As governments sought to address the global pandemic emergency, convalescent plasma became a high-profile, and promissory treatment, attracting the attention of politicians seeking solutions to the COVID-19 pandemic. For example, convalescent plasma studies attracted the particular attention of then-President Donald Trump and his administration, who sought to frame the Emergency Access Program through the Mayo Clinic as a Trump-led, life-saving initiative.[79] Politicians' promotion of convalescent plasma therapy in the media was in part responsible for prompting "unrelenting demand" of a scarce resource.[80] For example, the Delhi Health Minister, the first in the country to set up a plasma bank, refuted the ICMR's decision in

November 2020 to remove convalescent plasma from the national treatment guidelines following publication of the PLACID study results, reporting to the media that the

> Delhi government has done a lot of work on [convalescent plasma] and we took permission for trial runs, in any case. More than 2,000 people have been administered plasma in Delhi. I myself survived because of plasma therapy.[81]

Politicians' interest in providing widespread access to a promising therapy also threatened the recruitment efforts of clinical trials globally as people could readily access convalescent plasma outside of clinical trials. Recognizing this threat, in early April 2020, the UK NHS and Chief Medical Officers of Health sent out letters to all NHS clinicians urging trial participation, explaining "Use of treatments outside of a trial, where participation was possible, is a wasted opportunity to create information that will benefit others."[82] Similarly, Canadian scientists with the CONCOR trial emphasized the need to prioritize clinical trials efforts to determine safety and efficacy. In the closing remarks of a presentation on August 25th, 2020, the lead scientists concluded that convalescent plasma is a "promising therapy. We are trying to figure out if it works. Ignore everything coming out of the US." They noted that

> In some countries COVID-19 is becoming politicized. It shouldn't be politicized. It's a medical treatment. Listen to the scientists. Keep Canada out of the political nightmare and stick to the science. Focus on the science. Do the trials. Get answers for Canadians.[83]

By early 2021, the trials in India and Argentina had published their results,[84] and those in Canada and the UK had ended recruitment, noting that trials had reached their defined thresholds for futility and that preliminary analyses had found no significant difference between the treatment and control groups.[85] Finally, the CoVIg-19 Plasma Alliance announced on April 2, 2021 that the NIAID-funded clinical trial (ITAC) did not

meet its endpoints; they also reported no serious safety signals were raised.[86] The findings of no benefit were further confirmed through systematic reviews and meta-analyses,[87] and reflected in the ramping down of convalescent plasma donor recruitment programs. Originally envisioned as a stopgap or prophylactic measure, the clinical utility of convalescent plasma was clarified in some respects, though the question of its use as an equitable treatment in future pandemics—including among outpatients, the elderly, the immunocompromised, and those with early stage and mild disease—remains open.[88]

Discussion

This purposive sample of prominent, public-facing, trials of convalescent plasma as a treatment for COVID-19 offer important insights into the dynamics of clinical trials when public actors, including funders, independent scientific advisory groups, government-funded researchers, and institutions such as blood service operators lead and have a substantial place within the process of catalyzing, evaluating, and disseminating health technology innovations. Though these studies of convalescent plasma do not necessarily represent deliberate efforts to develop and implement alternative models for biopharmaceutical research and development, they can be analyzed with attention to that potential. Thus, the findings of this case study point to the nature of public sector innovation and its impact, which should be conceived in the context of wider infrastructure and capacity building developments.[89]

As part of a wider array of efforts to find treatments and vaccines for COVID-19, clinical studies of convalescent plasma and hyperimmune immunoglobulin represented a facet of a mission-oriented approach[90] on part of governments to address the public health crises posed by the COVID-19 pandemic. In setting a clear direction for efforts to address the anticipated, intense strain that the pandemic would put on health systems, governments could prioritize public health interests,[91] identifying convalescent plasma as a priority candidate

therapy because of its perceived availability, versatility, scalability, and affordability.[92] This case study also illustrates the ability of public sector actors to take on risk in terms of health innovation—the trials of convalescent plasma and hyperimmune immunoglobulin could produce negative results, and even in the instance of public-private partnerships (e.g. the ITAC trial), the public sector took on the risk of funding, conducting, and disseminating the clinical trial.

The findings of this case study thus add to growing challenges of the dominant discourse that drug research and development is best conducted by the private sector.[93] For example, in the development of a vaccine against Ebola, the pharmaceutical company credited with developing the vaccine did not make any progress until public funds were made available; thus, the vaccine was in fact a product of the combined efforts of government funding and publicly funded institutions.[94] Further, analysis of the development of the *r*VSV-ZEBOV Ebola vaccine suggests that sole reliance on the private sector for commercialization precluded exploration of alternative pathways to vaccine development and may in fact, have slowed progress. In contrast, the rapid proliferation of rigorous, publicly funded studies of convalescent plasma within the context of diverse national contexts, including diverse regulatory, blood services, and health systems, suggests that public sector innovation can be both expedient and experimental.

Public sector innovation can provide an important counterpoint to the secrecy and proprietary practices of industry-led innovation,[95] illustrated through the transparency of sampled trials and the high degree of sharing within personal and professional networks. However, mission-oriented innovation to address complex public health challenges also requires multiple competing solutions, bottom up experimentation, and public sector capacity characterized by diversity of expertise and skills.[96] The dissemination of generic trial protocols and mobilization of networks of friends, while facilitating rapid development and

implementation of rigorous protocols, may have benefited from greater diversity in terms of approach or multi-national collaboration to avoid duplication of effort. Sampled studies were led by highly established individuals who were well connected and influential with policymakers, regulators, the health system, and academia, and represented low risk investments in terms of expertise, skills, and access to resources to conduct studies of this magnitude under crisis conditions. Thus, efforts to diversify expertise, skills, and capacity within scientific advisory bodies, clinical trials networks, health research funders, and health system administration need to occur in preparation for the next public health crisis. Public sector innovation offers the opportunity to develop models of knowledge governance that is transparent, open, and premised on sharing in the public interest,[97] however, this case study suggests the need for governance mechanisms that work across national contexts to facilitate prioritization, allocate scarce resources, and avoid duplication of effort globally.

In the search for an equitable and accessible treatment for COVID-19, the clinical trials of convalescent plasma generated knowledge of optimal clinical use, allowing conservation of a scarce and valuable public resource, i.e., convalescent plasma. However, these studies also served to strengthen the wider public health infrastructure. For example, in several contexts, national interest in convalescent plasma prompted the development of blood services infrastructure including a legislative framework and plasma program development. The importance of established clinical trial networks and infrastructure, as illustrated by REMAP-CAP and the INSIGHT Network, also suggests the importance of building public sector capacity,[98] and demonstrated versatility and the ability to rapidly pivot under emergency conditions toward public health priorities, including partnering with industry where applicable.

These studies also shed light on the complicated politics of evidence and the challenges to scientific rigor, trust in health institutions, and ability to address public health

problems in a context where clinical trials are vulnerable to political exploitation. The public-facing aspects of these studies suggests a new era for transparency and a democratization of clinical research, with updates released via social media and preprints. However, these forms of transparency also lent themselves to scientific hype, to the detriment of several efforts to evaluate convalescent plasma within the context of an RCT, and do not fulfill the goals of open science in terms of traceability and replicability. This underscores the need to think through new forms of knowledge governance for public sector innovation that ensure transparency, but also accountability and scientific independence.

Strengths and limitations

While illustrative of a range of ways that trialists conducted studies of convalescent plasma during COVID-19, as a purposive sample and qualitative study, this case is not representative. This study was limited in terms of its reliance on publicly available documents and thus, key developments, decisions, or processes may not have been publicly documented. We sought to analyze the processes related to how convalescent plasma would be allocated, data sharing agreements, and intellectual property arrangements. However, given that these studies found convalescent plasma was not effective, these kinds of considerations did not arise in the sampled documents. Despite these limitations, this case study suggests the importance of studying the dynamics of public sector-led clinical trials for the possibility of rigorous knowledge and infrastructure creation in the public interest.

Conclusion

Global efforts to evaluate the safety and effectiveness of convalescent plasma as a treatment for COVID-19 can be analyzed as a form of public sector innovation given that they were predominantly funded, designed, conducted, and disseminated by public and health system actors. Characterized by an open science approach, efforts to build clinical trials and blood services capacity, and a high degree of collaboration, these trials provide insights into

the nature and value of innovation when pursued in the interest of public health. Through an in-depth, document-based case study of convalescent plasma, we abstracted key insights to enhance the likelihood of success of future models of biopharmaceutical production, designed in the service of ensuring equitable access to biopharmaceuticals, should the political will and financing to support such models someday follow.

Declarations

Ethics approval and consent to participate: N/A. This work did not involve human subjects.

Consent for publication: N/A. This work did not involve human subjects.

Availability of data and materials: Supplementary File 3 contains a full catalogue of sampled data sources.

Competing interests: QG, CC, RA, and KH declare no conflicts of interest. MH reports being a member of the Patented Medicine Prices Review Board, Canada's national drug price regulator, and receiving honoraria from the Board for his service.

Funding: This work was funded by the Social Science and Humanities Research Council (SSHRC) of Canada through a Partner Engage Grant and the MITACS Accelerate Program in partnership with Canadian Blood Services. MH holds funding from the Canadian Institutes of Health Research (CIHR PJT 156256) and has been awarded a chair in Applied Public Health, which is funded by the CIHR and the Public Health Agency of Canada.

Authors' contributions: QG, KH, and MH conceptualized and designed the study. QG acquired funding and provided supervision. QG, CC, KH, and RA performed document sampling, and data collection. All authors performed data analysis. QG drafted the manuscript. All authors performed data analysis, read, and approved the final manuscript.

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90. Mazzucato, *supra* note 13

91. Mazzucato, *supra* note 10

92. Hartmann, *supra* note 88

93. Herder, *supra* note 11; Mazzucato, *supra* note 12; Light, *supra* note 11; Gaffney, *supra* note 10

94. Herder, *supra* note 11

95. Mazzucato, *supra* note 10

96. Mazzucato, *supra* note 13

97. Mazzucato, *supra* note 10

98. Mazzucato, *supra* note 13

Table 1. Characteristics of included clinical studies of convalescent plasma for the treatment of SARS-CoV-2

Country, Trial	Design	Endpoints *denotes primary	Population	Registered	Sample size	Published protocol? Analysis plan? (Y=Yes, N=No)	Plasma source	Funder	Author affiliations	Data sharing
China, ChiCTRY2000029757	National, multicenter, randomized, open-label, parallel, unblinded controlled trial	28-day time to clinical improvement*, 28-day mortality, duration of hospitalization, ratio of negative viral test results	Hospitalized adults with severe and life-threatening COVID-19 infection	Y (Chinese Clinical Trial Registry)	103	Y, Y	Wuhan Blood Center	Chinese Academy of Medical Sciences (CAMS)	Institute of Blood Transfusion (CAMS)	Y, deidentified participant data, available by email request
UK, RECOVERY	National, multicenter, adaptive, open-label, factorial randomized, controlled trial	All-cause, 28 day mortality	Hospitalized adults (incl pregnant people) and children with COVID-19 infection	Y (EU Clinical Trials Register; ClinicalTrials.gov; ISRCTN Registry)	11558	Y,Y	NHS Blood and Transplant	NIHR	University of Oxford	Y, de-identified participant data, with approved proposal and 3 months after publication
UK/Global, REMAP-CAP	Global, multicenter, adaptive	All-cause, 90 day mortality	Adults admitted to intensive care with severe pneumonia	Y (EU Clinical Trials Register; ClinicalTrials.gov;	4763	Y,Y	NHS Blood and Transplant	European Union, NHMRC (Aus), HRC (NZ), CIHR (Canada)	UMC Utrecht	Y

				ISRCTN Registry)						
USA National Emergency Access Program	National, multi-center, open-label, emergency access program	Availability of COVID-19 convalescent plasma, serious adverse events (secondary)	Hospitalized adults with severe or life-threatening COVID-19 disease	Y (ClinicalTrials.gov)	>20,000	Y,Y	American Red Cross, American Association of Blood Banks, The Fight is In Us	BARDA, NIH	Mayo Clinic	Y, Limited, de-identified data sets available in research data repository and shared under controlled access procedures
India, PLACID	National, multi-centre, open label, parallel arm, phase II, randomised controlled trial	Composite of progression to severe disease or all-cause mortality at 28 days	Hospitalized adults with moderate COVID-19 disease	Y (Clinical Trial Registry of India)	464	Y	Hospital study sites	Indian Council of Medical Research (ICMR)	Indian Council of Medical Research	Y, deidentified participant level data available upon written request with a proposal
Argentina, PlasmAr Study	National, multi-center, double-blind, randomised, placebo-controlled, trial	Clinical status at 30 days	Hospitalized adults with severe COVID-19 pneumonia	Y (ClinicalTrials.gov)	332	Y	Not stated	Research Council of the Hospital Italiano de Buenos and participant institutions (no external funding)	Hospital Italiano de Buenos Aires	Not stated
Canada, CONvalescent	Multinational, multi-centre,	Need for intubation or	Hospitalized patients	Y	921	N	Canadian Blood	CIHR	Hamilton Health	Y De-identified

Plasma for Hospitalized Adults With COVID-19 Respiratory Illness CONCOR-1	open-label, randomised, controlled trial	patient death in hospital at 30 days	with COVID-19 infection aged 16 years and older and receiving supplemental oxygen	(ClinicalTrials.gov)			Services, Héma-Québec (Canada sites); New York Blood Center (US sites)	Health systems Foundations Canadian Blood Services, Héma-Québec	Sciences Corporation	individual patient data available upon request if use is concordant with existing REB approvals
USA/Global, Inpatient Treatment with Anti-Coronavirus Immunoglobulin (ITAC)	Global multi-centre, randomised, double-blind, placebo-controlled trial; remdesivir as standard of care	Clinical status on day 7*	Hospitalized adults at risk for serious complications of COVID-19 infection	Y (ClinicalTrials.gov)	593	N	Grifols (H-IgG) The Fight Is In Us	NIAID/ NIH INSIGHT Network	University of Minnesota	N

BARDA= US Biomedical Advanced Research and Development Authority; CAMS=Chinese Academy of Medical Sciences; CIHR= Canadian Institutes of Health Research; HRC=New Zealand Health Research Council; ICMR= Indian Council of Medical Research; NIAID=National Institute of Allergy and Infectious Diseases; NIH=National Institutes of Health; NIHR=United Kingdom National Institute of Health Research; NHMRC=Australian National Health and Medical Research Council

Table 2. Timeline of key events

Timelines

2020
February **08–** first patients to receive convalescent plasma for treatment of COVID-19 in China **12–** ChiCTR2000029757 trial registered with Chinese Clinical Trial Registry **14–** ChiCTR2000029757 trial recruitment begins
March **3–** Wuhan Blood Centre convalescent plasma donor recruitment pilot program begins **4–** Takeda announces intention to develop hyperimmune immunoglobulin (H-IgG) to US Congress **11–** WHO declares global pandemic **13–** Editorial on convalescent plasma published in the *J Clinical Investigation* **19–** UK RECOVERY trial registered with EU clinical trials registry; recruitment begins **19–** UK NIHR suspends nearly all clinical research to prioritize COVID-19 studies **21-24–** First meeting of the US national convalescent plasma project (CCPP19) **24–** US FDA invites applications for investigational new drug (IND) protocols for convalescent plasma **27–** ChiCTR2000029757 recruitment ends prematurely due to no new infections
April **1–** Initial IND for the convalescent plasma Emergency Access Program submitted to US FDA by Mayo Clinic **2–** US FDA approves Emergency Access Program and IND **3–** FDA announces National Emergency Access Program initiated through the Mayo Clinic **6–** Announcement of industry collaboration to develop and evaluate H-IgG for treatment of COVID-19 **7–** FDA releases **"**Investigational COVID-19 Convalescent Plasma: Guidance for Industry" **12–** Drugs Controller General of India approves protocol for PLACID trial; Indian Council of Medical Research launches call for intent for the study **15–** Canadian CONCOR trial registered with ClinicalTrials.gov **19–** REMAP-CAP immunoglobulin therapy domain-specific protocol approved **21–** PLACID trial registered with ClinicalTrials.gov **22–** PLACID trial begins recruitment across 39 trial sites
May **7–** CoVIg-19 Alliance announces ITAC, an NIH-funded trial of H-IgG **14–** RECOVERY trial adds convalescent plasma as a treatment under evaluation **14–** Canada's CONCOR trial of convalescent plasma begins recruitment **26–** Launch of national US campaign "The Fight Is In Us" to drive plasma donation **28–** PlasmAr trial in Argentina enrolls first patient
June **2–** Delhi opens the first public plasma bank in India **3–** RECOVERY trial administers convalescent plasma to first participant, a child **3–** Results of ChiCTR2000029757 published online in *JAMA* **11–** Grifols starts production of H-IgG in preparation for ITAC trial **11–** Early safety evaluation of convalescent plasma administered through Mayo Clinic Emergency Access Program published in the *J Clinical Investigation* **27–** Indian Government updates Clinical Management Protocol for COVID-19 to include convalescent plasma as an investigational therapy

July **19–** Full safety evaluation of convalescent plasma administered through Mayo Clinic Emergency Access Program published in *Proceedings of the Mayo Clinic*
August **20–** Convalescent plasma Emergency Access Program based at Mayo Clinic ends enrolment **23–** US FDA issues Emergency Use Authorization for convalescent plasma **27–** PlasmAr trial in Argentina concludes recruitment
September **8–** PLACID trial preprint published, followed by national media coverage **24–** ITAC NIH trial registered on ClinicalTrials.gov
October **8–** ITAC NIH trial of H-IgG enrolls first patient **22–** PLACID trial results published in *BMJ*
November **24–** PlasmAr results published in *NEJM*
2021
January **15–** RECOVERY trial closes enrolment for convalescent plasma arm on Data Monitoring Committee advice and makes public the preliminary result **29–** CONCOR trial stops enrolment after meeting defined threshold for futility
March **10–** RECOVERY posts preprint on convalescent plasma results
April **2–** CoVIg-19 Plasma Alliance announces that trial did not meet its endpoint; Alliance to be dissolved
May **17–** Indian Council of Medical Research national COVID taskforce removes convalescent plasma from Clinical Management Guidelines
September **9–** CONCOR publishes trial results in *Nature Medicine*
2022
January **27–** ITAC trial publishes results in *The Lancet*

Supplementary File 1. COREQ reporting guideline checklist.

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the data abstraction?	Data collection and analysis; pg 8
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Title Page
3. Occupation	What was their occupation at the time of the study?	Title Page
4. Gender	Was the researcher male or female?	N/A
5. Experience and training	What experience or training did the researcher have?	Title Page
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	N/A
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	N/A
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Introduction, Methods; Pages 4-7; Declarations
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Introduction, Methods; Pages 3-7
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Methods; Page 5-7
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	N/A
12. Sample size	How many participants were in the study?	Results; Pages 8-10; Supplementary File 3
13. Non-participation	How many people refused to participate or	N/A

	dropped out? Reasons?	
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	N/A
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	N/A
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Results; Page 8-10
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Supplementary File 2
18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	N/A
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Methods; Page 6-7
20. Field notes	Were field notes made during and/or after the interview or focus group?	Methods; Page 6-7
21. Duration	What was the duration of the interviews or focus group?	N/A
22. Data saturation	Was data saturation discussed?	Methods; Page 6-7
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	N/A
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Methods; Page 7
25. Description of the coding tree	Did authors provide a description of the coding tree?	Methods, Results; Page 7-15
26. Derivation of themes	Were themes identified in advance or derived from the data?	Methods, Results; Page 7, 11
27. Software	What software, if applicable, was used to manage the data?	Methods; Page 6-7
28. Participant checking	Did participants provide feedback on the findings?	N/A
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Results; Page 11-24
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Results; Page 11-24
31. Clarity of major themes	Were major themes clearly presented in the findings?	Results; Page 8-24
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Results; Page 8-24

Supplementary File 2. Data abstraction form.

Study family ID:
Name of coder:
Date:

Highlights

Timeline

Key insights/questions/themes

Overview

1. Provide a brief overview of the study/trial including the country, key sites, key investigators, primary aim, and participant population. Note if the study is complete, underway, or stopped and any salient or distinctive features of the study design (e.g. RCT vs observational, controls etc.).
    a. If a blood services operator is involved, please describe the nature of the involvement.
2. What kinds of documents are publicly available?
3. To what extent is the study public facing? For example, public websites, media coverage etc.

Identifying and describing the key entities and individuals involved

4. Where did the study source its convalescent plasma? To what extent is this entity involved in the study?

5. Who is the study funder and what is their involvement with the study? What is the nature of additional relationships between the sponsor and trialists or other entities?

6. How did the study identify and recruit study sites?

7. Are there any prominent individuals or campaigns that are promoting the study or encouraging plasma donation for the study? (I am mostly thinking celebrities, or campaigns like "The fight is in us," but I suppose this could include government too. Like I'm not sure if Trudeau has spoken publicly asking people to donate CP but that would count.

8. Who is primarily responsible for the study/trial and integrity of the data? What is their role in the study?

Regulatory processes

9. Describe the existing regulatory oversight and context for convalescent plasma and relevant regulators for the study (i.e. emergency use authorization, off-label use authorization, trial-only status, research ethics boards, health product regulators, industry standards etc.).

Social aspects of clinical trial processes – facilitators and hurdles

10. What were key challenges or hurdles in conducting the trial?
11. What were key facilitators?

12. Other pragmatic issues?

Legal, ethical, and equity issues

13. Where did the entity source their convalescent plasma? Geographically? Population-wise?

14. How were convalescent plasma donors recruited? What information were they given about the study or the use of their plasma? What rights were they given in regard to withdrawal? Were they compensated and if so, how? What is the process for registration/donation? Were individual donors informed about their antibody levels (i.e. had results returned)?

15. How were study participants recruited? How is the convalescent plasma allocated or distributed (i.e. under emergency use or if proven safe and effective)?

16. What are the plans for sharing data about convalescent plasma recipients?

17. What intellectual property mechanisms pertain to the intervention (i.e. patent protection or other IP provision)?

Supplementary File 3. Catalogue of sampled documents.

Study Record ID	Document type	Document title	Document author	Document publisher	Date published	Date sampled
ChiCTR2000029757_ China	News	Everything you need to know about WeChat — China's billion-user messaging app	Kharpal, A	CNBC	03.02.2019	30.03.2021
ChiCTR2000029757_ China	News	Chinese man contributes 4,000mL of plasma to help COVID-19 patients	Kun, L & Nyima, P	China Daily	22.07.2020	21.03.2021
ChiCTR2000029757_ China	News	Effect of convalscent plasma therapy on time to clinical improvement in patients with severe and life-threatening COVID-19	Thompson, M	Twitter	10.06.2020	21.03.2021
ChiCTR2000029757_ China	News	Counseling plays a vital role	Jin Zhou and Kun Liu	China Daily	26.01.2021	24.03.2021
ChiCTR2000029757_ China	News	China Focus: China develops convalescent plasma therapy for COVID-19 patients	Huaxia	Xinhua Net	14.02.2020	31.03.2021
ChiCTR2000029757_ China	News	Convalescent plasma not helpful in China study; hydroxychloroquine doesn't prevent infection	Lapid, N	Reuters	03.06.2020	30.03.2021
ChiCTR2000029757_ China	News	Cured COVID-19 patients donate plasma to save more	Huaxia	Xinhua Net	18.02.2020	31.03.2021
ChiCTR2000029757_ China	News	Thankful COVID-19 patient gives plasma	Liu, K & Wang, X	China Daily	25.08.2020	31.03.2021
ChiCTR2000029757_ China	News	China's Wuhan to build COVID-19 convalescent plasma pool	Huaxia	Xinhua Net	07.07.2020	21.03.2021
ChiCTR2000029757_ China	Protocol	Convalescent plasma for the treatment of severe and critical/lifethreatening COVID-19: a prospective randomized controlled trial	Li et al.	JAMA	22.02.2020	20.03.2021
ChiCTR2000029757_ China	Publication	Feasibility of a pilot program for COVID-19 convalescent plasma collection in Wuhan, China	Ling Li et al.	Transfusion	31.07.2020	29.03.2021
ChiCTR2000029757_ China	Publication	Effect of Convalescent Plasma Therapy on Time to Clinical Improvement in Patients With Severe and Life-threatening COVID-19 A Randomized Clinical Trial	Li et al.	JAMA	03.06.2020	21.03.2021
ChiCTR2000029757_ China	Publication supplement	Data Sharing Statement	Li et al.	JAMA	01.06.2020	21.03.2021

ChiCTR2000029757_ China	Publication supplement	Supplementary Online Content	Li et al.	JAMA	04.08.2020	30.03.2021
ChiCTR2000029757_ China	Publication supplement	CCP workflow diagram - Feasibility of a pilot program for COVID-19 convalescent plasma collection in Wuhan, China	Ling Li et al.	Transfusion	31.07.2020	29.03.2021
ChiCTR2000029757_ China	Publication supplement	Recruitment material [chinese] (Feasibility of pilot program)	Ling Li et al.	Transfusion	31.07.2020	24.03.2021
ChiCTR2000029757_ China	Publication supplement	Recruitment material - Supplemental material for figure 2 [English] (not a word-by-word translation) (Feasibility of pilot program)	Ling Li et al.	Transfusion	31.07.2020	24.03.2021
ChiCTR2000029757_ China	Publication supplement	Statistiscal Analysis Plan	Li et al.	JAMA	03.06.2020	21.03.2021
ChiCTR2000029757_ China	Regulatory	Position Paper on Use of Convalescent Plasma, Serum or Immune Globulin Concentrates as an Element in Response to an Emerging Virus	WHO Blood Regulators Network (BRN)	WHO	14.09.2017	21.03.2021
ChiCTR2000029757_ China	Trial registry record	Convalescent plasma for the treatment of severe novel coronavirus pneumonia (COVID-19): a prospective randomized controlled trial (V1.1)	Zhong, L	Chinese Clinical Trial Registry	03.03.2020	21.03.2021
ChiCTR2000029757_ China	Website	Trial ChiCTR2000029757	Covid-19 Living Data	Covid-19 Living Data	n.d.	21.03.2021
CONCOR_Canada	Conference presentation	CADTH Session on CONCOR	Canadian Agency for Drugs and Technologies	Canadian Agency for Drugs and Technologies	n.d.	25.08.2020
CONCOR_Canada	Conference presentation	CADTH session on Blood Plasma Therapies for COVID-19	Devine D, Callum J, McGurn S	Canadian Agency for Drugs and Technologies	n.d.	25.08.2020
CONCOR_Canada	News	Shrinking number of new COVID-19 patients in Canada slowing down major treatment study	Pinkerton, C	ipolitics.ca	22.05.2020	25.05.2020

CONCOR_Canada	News	Plasma project could use blood of COVID-19 survivors to help save the newly infected	Grant, K	The Globe and Mail	28.08.2020	28.08.2020
CONCOR_Canada	News	More hospitals part of plasma transfusion trial to treat COVID-19 with antibodies	Czlarski C, Canadian Press	CochraneTODAY	28.05.2020	29.03.2021
CONCOR_Canada	News	Convalescent Plasma Strikes Out as COVID-19 Treatment	Harris, R	KPBS	10.02.2020	29.03.2021
CONCOR_Canada	News	FDA under pressure from Trump, authorizes blood plasma as COVID-19 treatment	Florko, N	STAT	23.08.2020	31.08.2020
CONCOR_Canada	News	Major study finds convalescent plasma doesn't help seriously ill COVID-19 patients	McMaster University	McMaster University	9.10.2021	10.5.21
CONCOR_Canada	Publication	Convalescent Plasma Therapy for the Treatment of COVID-19: A Review of Clinical Effectiveness	Subramoni an A, Young C, Loshak H, McCormac k S, Clark M	Canadian Agency for Drugs and Technologies	23.07.2020	10.12.2020
CONCOR_Canada	Publication	Convalescent plasma for hospitalized patients with COVID-19: an open-label, randomized controlled trial	Begin, P et al	Nature Medicine	09.09.2021	10.5.21
CONCOR_Canada	Publication supplement	Steering Committee	CONCOR-1	CONCOR-1	n.d.	25.05.2020
CONCOR_Canada	Social media	100 patients enrolled in last 15 days…	CONCOR-1	CONCOR-1	26.10.2020	27.10.20
CONCOR_Canada	Trial registry record	CONvalescent Plasma for Hospitalized Adults With COVID-19 Respiratory Illness (CONCOR-1) (CONCOR-1)	McMaster University	ClinicalTrials.gov	16.04.2020	24.02.2021
CONCOR_Canada	Website	COVID-19 and convalescent plasma	Canadian Blood Services	Canadian Blood Services	n.d.	23.09.2020
CONCOR_Canada	Website	Daily COVID-19 digest: April 2, 2020	Canadian Blood Services	Canadian Blood Services	02.04.2020	23.09.2020

CONCOR_Canada	Website	Daily COVID-19 digest: April 30, 2020	Canadian Blood Services	Canadian Blood Services	30.04.2020	23.09.2020
CONCOR_Canada	Website	Daily COVID-19 digest: June 11, 2020	Canadian Blood Services	Canadian Blood Services	11.06.2020	23.09.2020
CONCOR_Canada	Website	Daily COVID-19 digest: May 7, 2020	Canadian Blood Services	Canadian Blood Services	7.05.2020	23.09.2020
CONCOR_Canada	Website	Daily COVID-19 digest: May 14, 2020	Canadian Blood Services	Canadian Blood Services	14.05.2020	23.09.2020
CONCOR_Canada	Website	Daily COVID-19 digest: May 25, 2020	Canadian Blood Services	Canadian Blood Services	25.05.2020	23.09.2020
CONCOR_Canada	Website	Donating Plasma at Canadian Blood Services	Canadian Blood Services	Canadian Blood Services	n.d.	23.09.2020
CONCOR_Canada	Website	First COVID-19 Convalescent Plasma Donor	Canadian Blood Services	Canadian Blood Services	29.04.2020	23.09.2020
CONCOR_Canada	Website	How your plasma donation helps	Canadian Blood Services	Canadian Blood Services	n.d.	23.09.2020
CONCOR_Canada	Website	Open Board Meeting	Canadian Blood Services	Canadian Blood Services	n.d.	23.09.2020
CONCOR_Canada	Website	CONCOR-1 Clinical Trial Website	CONCOR-1	CONCOR-1	n.d.	24.02.2021
CONCOR_Canada	Website	COVID-19 Convalescent Plasma for Patients	Canadian Blood Services	Canadian Blood Services	02.04.2020	27.09.2020
CONCOR_Canada	Website	COVID-19 information for employees and volunteers - filtered Q&A	Canadian Blood Services	Canadian Blood Services	n.d.	23.09.2020

EAP_Mayo_US	Blog	Understanding the FDA's controversial convalescent plasma authorization	Sachs, R	Health Affairs Blog	27.08.2020	14.4.21
EAP_Mayo_US	Blog	Calling all heroes: the power of a plasma partnership	Wood, B	Mitre Corporation	01.10.2020	14.4.21
EAP_Mayo_US	Blog	For early testing of convalescent plasma, we were 'building the plane while we were flying it'	Joyner, M	Stat News	04.03.2021	14.4.21
EAP_Mayo_US	Consent form	Expanded access program patient consent and privacy authorization	Joyner, M	Mayo Clinic	15.04.2020	13.4.21
EAP_Mayo_US	Investigator brochure	Clinical investigator's brochure for use of convalescent plasma to treat Coronavirus-19 (COVID-19) disease V1.0	Joyner, M	Mayo Clinic	04.09.2020	13.4.21
EAP_Mayo_US	News	FDA to allow for plasma therapy for COVID-19 patients	Winter, L	The Scientist	26.04.2020	13.4.21
EAP_Mayo_US	News	A desperate scramble as COVID-19 families vie for access to plasma therapy	Aleccia, J	Kaiser Health News	15.04.2020	13.4.21
EAP_Mayo_US	News	97,000 people got convalescent plasma. Who knows if it worked?	Rogers, A	Wired	21.08.2020	14.4.21
EAP_Mayo_US	News	As Trump praises plasma, researchers struggle to finish critical studies	Thomas, K	The New York Times	04.08.2020	14.4.21
EAP_Mayo_US	News	Market for blood plasma from COVID-19 suvivors heats up	Aleccia, J	NPR	11.05.2020	14.4.21
EAP_Mayo_US	News	Two P.R. experts at F.D.A. have been ousted after blood plasma fiasco	Kaplan, S	The New York Times	28.08.2020	14.4.21
EAP_Mayo_US	News	F.D.A. 'grossly misrepresented' blood plasma data, scientists say	Thomas, K	The New York Times	24.08.2020	14.4.21
EAP_Mayo_US	News	F.D.A.'s emergency approval of blood plasma is now on hold	Weiland, N	The New York Times	19.08.2020	14.4.21
EAP_Mayo_US	News	NBA players who've beaten COVID-19 to donate blood for new treatment	Abdelmalek, M	ABC News	31.03.2020	14.4.21
EAP_Mayo_US	News	America needs plasma from COVID-19 survivors now	Zhang, S	The Atlantic	28.03.2020	14.4.21
EAP_Mayo_US	News	Racing against time, medical researchers, life science companies and COVID-19 survivors	Harringa, A	Mayo Clinic	26.05.2020	14.4.21

		launch national campaign to drive plasma donation				
EAP_Mayo_US	News	Blood plasma from people who recovered is a safe covid-19 treatment, study says	Johnson, CY	The Washington Post	18.06.2020	14.4.21
EAP_Mayo_US	Preprint	Program and patient characteristics for the United States Expanded Access Program to COVID-19 convalescent plasma	Senefeld, J et al (& Joyner, M as SA)	medRxiv	11.04.2021	13.4.21
EAP_Mayo_US	Press release	FDA issues Emergency Use Authorization for convalescent plasma as potential promising COVID–19 treatment, another achievement in administration's fight against pandemic	US FDA	US FDA	23.08.2020	13.4.21
EAP_Mayo_US	Press release	Mayo Clinic receives $26 million from BARDA for COVID-19 convalescent plasma expanded access program	Harringa, A	Mayo Clinic	04.05.2020	13.4.21
EAP_Mayo_US	Press release	Coronavirus (COVID-19) update: FDA coordinates national effort to develop blood-related therapies for COVID-19	US FDA	US FDA	04.03.2020	13.4.21
EAP_Mayo_US	Press release	Mayo Clinic named national site for Convalescent Plasma Expanded Access Program	Anastasijevic, D	Mayo Clinic	04.03.2020	13.4.21
EAP_Mayo_US	Press release	AABB launches new website to inform public about convalescent plasma	AABB	AABB	04.03.2020	14.4.21
EAP_Mayo_US	Press release	Library of Congress selects Mayo's convalescent plasma website for Coronavirus Web Archive	Schanilec, K	Mayo Clinic	19.11.2020	14.4.21
EAP_Mayo_US	Protocol	Expanded access to convalescent plasma for the treatment of patients with COVID-19 V 2.0	Joyner, M	Mayo Clinic	03.04.2020	13.4.21
EAP_Mayo_US	Publication	Convalescent plasma antibody levels and the risk of death from Covid-19	Joyner, M et al	The New England Journal of Medicine	13.1.2021	13.4.21
EAP_Mayo_US	Publication	Safety update: COVID-19 convalescent plasma in 20,000 hospitalized patients	Joyner, M et al	Proceedings of the Mayo Clinic	19.07.2020	13.4.21
EAP_Mayo_US	Publication	Early safety indicators of COVID-19 convalescent plasma in 5000 patients	Joyner, M et al	J Clin Investigation	11.06.2020	13.4.21

EAP_Mayo_US	Publication	How did we rapidly implement a convalescent plasma program?	Budhai et al	Transfusion	01.07.2020	13.4.21
EAP_Mayo_US	Regulatory	Regulatory documents for sites participating in the National Expanded Access Program (IND 19832) for the use of COVID-19 convalescent plasma in the treatment of COVID-19 disease	Mayo Clinic Institutional Review Board	Mayo Clinic	01.09.2020	13.4.21
EAP_Mayo_US	Regulatory	Emergency Use Authorization request for convalescent plasma for the the treatment of patients with COVID-19	Office of the Assistant Secretary for Preparedness and Response	US FDA	23.08.2020	13.4.21
EAP_Mayo_US	Regulatory	Letter in response to request that the Food and Drug Administration (FDA) issue an Emergency Use Authorization (EUA) for emergency use of COVID-19 convalescent plasma	Hinton, DM	US FDA	23.08.2020	13.4.21
EAP_Mayo_US	Regulatory	IRB Continuing Review Approval	Mayo Clinic Institutional Review Board	Mayo Clinic	26.03.2021	13.4.21
EAP_Mayo_US	Regulatory	Comparing EAP vs. EUA: What you need to know	None listed	Mayo Clinic	25.08.2020	13.4.21
EAP_Mayo_US	Regulatory	Investigational COVID-19 convalescent plasma: Guidance for industry	US FDA	US FDA	11.02.2021	13.4.21
EAP_Mayo_US	Regulatory	Letter: EUA high-titer convalescent plasma	US FDA	US FDA	09.03.2021	13.4.21
EAP_Mayo_US	Site list	List of all enrolled sites and providers that were a part of the Expanded Access Program	Joyner, M	Mayo Clinic	04.03.2021	13.4.21

EAP_Mayo_US	Site map	Graphical representation of enrolled patients, blood banks and hospitals by county in the United States	Joyner, M	Mayo Clinic	04.03.2021	13.4.21
EAP_Mayo_US	Trial registry record	Expanded Access to Convalescent Plasma for the Treatment of Patients With COVID-19	Joyner, M	ClinicalTrials.gov	04.08.2020	14.4.21
EAP_Mayo_US	Website	USCovidPlasma.Org	Joyner, M	Mayo Clinic	2021	13.4.21
EAP_Mayo_US	Website	National COVID-19 Convalescent Plasma Project	CCPP19	Michigan State University	03.03.2021	13.4.21
EAP_Mayo_US	Website	COVIDplasma.org	AABB	AABB	04.03.2020	14.4.21
ITAC_CoVIg-19_Alliance	Blog	Helping survivors become heroes	Bitran, H	Microsoft	20.04.2020	14.4.21
ITAC_CoVIg-19_Alliance	Editorial	Using a global network of adaptive clinical trials to fight Covid-19	Plump, A & Reese, D	Stat News	07.23.2020	24.2.21
ITAC_CoVIg-19_Alliance	News	College says students may have sought COVID-19 infection to boost plasma donor payout	Chappell, B	NPR	13.10.2020	14.4.21
ITAC_CoVIg-19_Alliance	Preprint	Production of anti-SARS-CoV-2 hyperimmune globulin from convalescent plasma	Vandeberg et al.	bioRxiv	20.11.2020	13.4.21
ITAC_CoVIg-19_Alliance	Preprint	Rapidly increasing SARS-CoV-2 neutralization by intravenous immunoglobulins produced from plasma collected during the 2020 pandemic	Farcet et al (Baxter/Takeda scientists)	bioRxiv	21.02.2021	13.4.21
ITAC_CoVIg-19_Alliance	Press release	Takeda Initiates Development of a Plasma-Derived Therapy for COVID-19	Takeda Pharmaceutical Company Limited	Takeda Pharmaceutical Company Limited	03.04.2020	18.2.21
ITAC_CoVIg-19_Alliance	Press release	Global Plasma Leaders Collaborate to Accelerate Development of Potential COVID-19 Hyperimmune Therapy	Takeda Pharmaceutical Company Limited	Takeda Pharmaceutical Company Limited	04.06.2020	24.2.21

ITAC_CoVIg-19_Alliance	Press release	CoVIg-19 Plasma Alliance Builds Strong Momentum Through Expanded Membership and Clinical Trial Collaboration	Takeda Pharmaceutical Company Limited	Takeda Pharmaceutical Company Limited	05.07.2020	24.2.21
ITAC_CoVIg-19_Alliance	Press release	Racing Against Time, Medical Researchers, Life Science Companies and COVID-19 Survivors Launch National Campaign to Drive Blood Plasma Donation	Takeda Pharmaceutical Company Limited	Takeda Pharmaceutical Company Limited	05.26.2020	24.2.21
ITAC_CoVIg-19_Alliance	Press release	First Patient Enrolled in NIH Phase 3 Trial to Evaluate Potential COVID-19 Hyperimmune Medicine	Takeda Pharmaceutical Company Limited	Takeda Pharmaceutical Company Limited	10.08.2020	24.2.21
ITAC_CoVIg-19_Alliance	Press release	NIH clinical trial testing hyperimmune intravenous immunoglobulin plus remdesivir to treat COVID-19 begins	National Institutes of Health	National Institutes of Health	08.10.2020	12.4.21
ITAC_CoVIg-19_Alliance	Press release	Australian research at the centre of landmark treatment trial for COVID-19	University of New South Wales	University of New South Wales	29.10.2020	12.4.21
ITAC_CoVIg-19_Alliance	Press release	Emergent BioSolutions and Mount Sinai Health System announce initiation of DOD-funded xlinical program to evaluate COVID-19 human hyperimmune globulin (COVID-HIG) product candidate for prophylaxis	Emergent BioSolutions	GlobeNewswire	29.12.2020	13.4.21
ITAC_CoVIg-19_Alliance	Press release	CoVIg-19 Plasma Alliance announces topline results from NIH-sponsored clinical trial of investigational COVID-19 hyperimmune globulin medicine	CoVIg-19 Plasma Alliance	BusinessWire	02.04.2021	12.4.21
ITAC_CoVIg-19_Alliance	Protocol	Protocol Synopsis INSIGHT 013 Inpatient Treatment with Anti-Coronavirus Immunoglobulin	INSIGHT Network	INSIGHT Network	20.08.2020	12.4.21

ITAC_CoVIg-19_Alliance	Report	Grifols 2020 Annual Results	Grifols	Grifols	31.12.2020	13.4.21
ITAC_CoVIg-19_Alliance	Trial registry record	Inpatient Treatment With Anti-Coronavirus Immunoglobulin (ITAC)	University of Minnesota	ClinicalTrials.gov	9.14.2020	24.2.21
ITAC_CoVIg-19_Alliance	Website	Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV)	National Institutes of Health	National Institutes of Health	2020	12.4.21
ITAC_CoVIg-19_Alliance	Website	INSIGHT 013 (ITAC)	INSIGHT Network	INSIGHT Network	20.08.2020	12.4.21
ITAC_CoVIg-19_Alliance	Website	CoVIg-19 Plasma Alliance	CoVIg-19 Plasma Alliance	Microsoft	02.24.2021	24.2.21
ITAC_CoVIg-19_Alliance	Website	DonatingPlasma.Org	Plasma Protein Therapeutics Association (PPTA)	Plasma Protein Therapeutics Association (PPTA)	2020	16.3.21
ITAC_CoVIg-19_Alliance	Website	Plasma Protein Therapeutics Association (PPTA)	Plasma Protein Therapeutics Association (PPTA)	Plasma Protein Therapeutics Association (PPTA)	2020	16.3.21
ITAC_CoVIg-19_Alliance	Website	The Fight Is In Us	CoVIg-19 Plasma Alliance	Microsoft and The MITRE Corporation	26.05.2020	16.3.21
ITAC_CoVIg-19_Alliance	Website	Survivor Corps	Survivor Corps	Survivor Corps	16.03.2021	16.3.21
PLACID_India	Blog	The story of the PLACID Trial—a democratisation of research	Agarwal, A et al	BMJ	02.11.2020	27.11.20
PLACID_India	Editorial	Convalescent plasma is ineffective for covid-19	Pathak, EB	BMJ	23.10.2020	27.11.20

PLACID_India	News	ICMR says no, but here's why doctors are still keen on plasma treatment for Covid patients	Sirur, S & Agarwal, S	The Print	30.10.2020	27.11.20
PLACID_India	News	Plasma therapy under ICMR cloud, Delhi Health Minister bats for it: Saved my life	Saxena, A	The Indian Express	22.10.2020	2.12.20
PLACID_India	News	COVID-19 PLACID trial: ICMR approves 21 institutions for participating in Coronavirus plasma therapy trials	PTI	Financial Express	06.05.2020	3.12.20
PLACID_India	News	Plasma therapy effective for moderately ill patients, say most doctors of IMCR trial	Mehrotra, K	The Indian Express	22.07.2020	3.12.20
PLACID_India	News	How Facebook groups, websites are helping Covid patients connect with plasma donors	Krishnankutty, P	The Print	01.07.2020	3.12.20
PLACID_India	News	COVID-19 In Mumbai: Few Takers For Plasma Therapy	Sarkar, A	Mid-day.com	22.07.2020	3.12.20
PLACID_India	News	Exclusive: Coronavirus pandemic fuels black-market for plasma of recovered patients	Khan, J	India Today	22.07.2020	3.12.20
PLACID_India	News	USFDA may give impetus to plasma therapy in India, experts question efficacy	Mukherjee, R	Times of India	25.08.2020	3.12.20
PLACID_India	Preprint	Convalescent plasma in the management of moderate COVID-19 in India: An open-label parallel-arm phase II multicentre randomized controlled trial (PLACID Trial)	Agarwal, A et al	MedRx	08.09.2020	2.12.20
PLACID_India	Press release	Evidence Based Advisory to address Inappropriate Use of Convalescent Plasma in COVID-19 Patients	Indian Council of Medical Research	Government of India	17.11.2020	3.12.20
PLACID_India	Protocol	A Phase II, Open Label, Randomized Controlled Trial to Assess the Safety and Efficacy of Convalescent Plasma to Limit COVID-19 Associated Complications in Moderate Disease	Drugs Controller General (India)	Government of India	22.04.2020	3.12.20
PLACID_India	Publication	Convalescent plasma in the management of moderate covid-19 in adults in India: open label phase II multicentre randomised controlled trial (PLACID Trial)	Agarwal, A et al	BMJ	22.10.2020	27.11.20

PLACID_India	Publication supplement	Supplementary File 1	Agarwal, A et al	BMJ	22.10.2020	27.11.20
PLACID_India	Publication supplement	Annexure 1 Author details (PLACID Trial Collaborators)	Agarwal, A et al	BMJ	22.10.2020	27.11.20
PLACID_India	Regulatory	Information on Convalescent Plasma in COVID-19	Central Drugs Standard Control organisation (Biological Division)	Government of India	01.07.2020	27.11.20
PLACID_India	Regulatory	Permission for approval of protocol for a multi-center two arm prospective, phase-II open labeled randomized controlled trial of convalescent plasma in COVID-19 patients-Regarding	Drugs Controller General (India)	Government of India	14.04.2020	3.12.20
PLACID_India	Study document	Call for Letter of Intent for Participation in: Therapeutic Plasma Exchange in COVID-19: Protocol for a Multi-center, Phase II, Open Label, Randomized Controlled Study	Agarwal, A	Indian Council of Medical Research	12.04.2020	3.12.20
PLACID_India	Study document	Call for Letter of Intent for Participation in: A Phase II, Open Label, Randomized Controlled Study to Assess the Safety and Efficacy of Convalescent Plasma to Limit COVID-19 Associated Complications	Agarwal, A	Indian Council of Medical Research	12.04.2020	3.12.20
PLACID_India	Trial registry record	Study to assess the efficacy and safety of convalescent plasma in moderate COVID-19 disease	Mukherjee, A et al	Clinical Trials Registry of India	21.04.2020	2.12.20
PlasmAr_Argentina	News	Lower house approves bipartisan project to promote blood plasma donation	Buenos Aires Times	Buenos Aires Times	26.06.2020	28.02.21
PlasmAr_Argentina	News	Deputies approved the project that creates a plasma donation campaign	None listed	Télam	26.06.2020	18.02.21

PlasmAr_Argentina	News	Blood Plasma Reduces Risk of Severe Covid-19 if Given Early	Katherine J. Wu	The New York Times	06.01.2021	18.02.21
PlasmAr_Argentina	News	Recovered COVID-19 patients donate plasma for treatment in Argentina	Bianco, ML	Reuters	03.07.2020	24.02.21
PlasmAr_Argentina	News	Argentina - More blood, more life: Argentina's hunt for new donors	None listed	Emerald Group Publishing Limited	04.10.2020	01.03.21
PlasmAr_Argentina	Regulatory	ESPECIALIDAD HEMOTERAPIA	Dirección de Sangre y Hemoderivados	Ministerio de Salud de la Nación	n.d.	01.03.2021
PlasmAr_Argentina	Regulatory	Administrative and Technical Rules (Transfusion regulation)	ESPECIALIDAD HEMOTERAPIA	Ministerio de Salud de la Nación	n.d.	24.02.2021
PlasmAr_Argentina	Website	How We Work: Fundación INFANT	Fundación INFANT	Fundación INFANT	2021	24.02.2021
PlasmAr_Argentina	Website	Proyecto Plasma	Fundación INFANT	Fundación INFANT	n.d.	18.02.2021
PlasmAr_Argentina	Website	Donate Blood In Quarantine	Sarmiento Hematology Foundation	Sarmiento Hematology Foundation	n.d.	20.02.2021
PlasmAr_Argentina	Website	Study results: Plasma of convalescent patients	Fundación INFANT	Fundación INFANT	n.d.	01.03.2021
PlasmAr_Argentina	Website	We are DonARG, and we want to save lives.	DonARG	DonARG	n.d.	18.02.2021
PlasmAr_Argentina	Consent form	Consentimiento informado sobre transfusion de plasma convaleciente de COVID-19 [adult]	Institudo de Hemoterapia	Goberno de la provincia de Buenos Aires	21.09.2020	19.03.2021
PlasmAr_Argentina	Consent form	Consentimiento informado sobre transfusion de plasma convaleciente de COVID-19 [pediatric]	Institudo de Hemoterapia	Goberno de la provincia de Buenos Aires	n.d.	19.03.21
PlasmAr_Argentina	News	Convalescent Plasma Flunks Study in COVID-19 Patients with Severe Pneumonia	Keown, A	BioSpace	25.11.2020	16.03.2021

PlasmAr_Argentina	News	Coronavirus in Argentina: they prepare a large trial with convalescent serum	Bär, N	La Nacion	14.04.2020	17.03.2021
PlasmAr_Argentina	News	No benefit seen from plasma treatment in severe COVID-19; virus may hurt male fertility	Lapid, N	Reuters	25.11.2020	16.03.2021
PlasmAr_Argentina	News	Plasma from recovered patients shows little benefit in those hospitalized with COVID-19: study	Chander, V	Reuters	n.d.	17.03.2021
PlasmAr_Argentina	News	Argentina study moves needle away from convalescent plasma for COVID-19	Wong, S	Biocentury	2021	17.03.2021
PlasmAr_Argentina	News	Plasma extraction for coronavirus: why it is urgent for recovered Argentine patients to donate their blood	Martin, H	Infobae	05.06.2020	17.03.2021
PlasmAr_Argentina	News	COVID-19: This Buenos Aires hospital questions the most famous treatment against the virus	InfoTechnology	InfoTechnology	10.02.2020	18.03.2021
PlasmAr_Argentina	News	Plasma donation: why is it necessary to explain what is important?	Rueda, GD	La Nueva	02.08.2020	20.03.2021
PlasmAr_Argentina	News	The Hospital de Clínicas will use plasma from recovered people as treatment	None listed	Télam	05.05.2020	20.03.2021
PlasmAr_Argentina	Protocol	No effect of Convalescent Plasma in Covid-19 severe pneumonia: The PlasmAr Trial	Simonovich VA, Burgos Pratx LD, Scibona P, et al	The New England Journal of Medicine	2021	10.03.2021
PlasmAr_Argentina	Publication	[Plasma therapy of convalescents in COVID-19 patients in the province of Buenos Aires]	Gonzáles, S et al.	MEDICINA (Buenos Aires)	2020	19.03.2021
PlasmAr_Argentina	Publication	A Randomized Trial of Convalescent Plasma in Covid-19 Severe Pneumonia	Simonovich VA, Burgos Pratx LD, et al	The New England Journal of Medicine	18.02.2021	03.03.2021
PlasmAr_Argentina	Publication supplement	Disclosure Forms (blank)	Simonovich VA, Burgos	The New England Journal of Medicine	18.02.2021	10.03.2021

			Pratx LD, et al			
PlasmAr_Argentina	Regulatory	Solicitud de plasma convaleciente COVID-19	Institudo de Hemoterapia	Goberno de la provincia de Buenos Aires	16.06.2020	19.03.2021
PlasmAr_Argentina	Trial registry record	Convalescent Plasma and Placebo for the Treatment of COVID-19 Severe Pneumonia (PLASM-AR)	Hospital Italiano de Buenos Aires	ClinicalTrials.gov	05.12.2020	18.03.2021
PlasmAr_Argentina	Website	Convalescent Plasma and Placebo for the Treatment of COVID-19 Severe Pneumonia (PLASM-AR)	ClinicalTrials.gov	ClinicalTrials.gov	12.05.2020	16.03.2021
PlasmAr_Argentina	Website	Scientists develop protocols to use the plasma from recovered patients in the treatment of severe cases of COVID-19	Biological and Health Sciences	Conicet	17.04.2020	18.03.2021
PlasmAr_Argentina	Website	A group of scientists and doctors, who ad honorem, are developing emergency protocols for the use of plasma from convalescent patients COVID-19 to patients who have the disease	CPC-19	CPC-19	2020	20.03.2021
PlasmAr_Argentina	Website	Plasma donation from recovered COVID-19 patients	Argentina Unida	Argentina Unida	n.d.	19.03.2021
PlasmAr_Argentina	Website	La Plata,15 de Septiembre de 2020	Goberno de la provincia de Buenos Aires	Goberno de la provincia de Buenos Aires	15.09.2020	19.03.2021
PlasmAr_Argentina	Website	Resultados del ensayo PLASM-AR	Hospital Italiano	Hospital Italiano	n.d.	19.03.2021
PlasmAr_Argentina	Website	Resultados del ensayo PLASM-AR	Hospital Italiano	Hospital Italiano	n.d.	19.03.2021
PlasmAr_Argentina	Website	A promising COVID-19 treamtent gets fast-tracked	Spencer, G	Johns Hopkins University	08.04.2020	18.03.2021
PlasmAr_Argentina	Website	Health Regulations in the Health Emergency Declared for COVID-19	Mairal, MO	Mairal, MO	15.10.2020	18.03.2021

RECOVERY_UK	Blog	Support of NHS staff will be crucial in testing convalescent plasma treatment for the sickest COVID-19 patients	Miflin, G	NHS England	25.06.2020	11.12.20
RECOVERY_UK	Blog	How we're supporting COVID-19 convalescent plasma trials	Pinches, H	NHS Digital	30.06.2020	11.12.20
RECOVERY_UK	COI disclosure forms	Dexamethasone in Hospitalized Patients with Covid-19 — Preliminary Report	The RECOVERY Collaborative Group	The New England Journal of Medicine	17.07.2020	10.12.20
RECOVERY_UK	Consent form	Participant Information and Consent Form (Adults)	The RECOVERY Collaborative Group	University of Oxford	21.11.2020	10.12.20
RECOVERY_UK	Consent form	Participant Information and Consent Form (Children)	The RECOVERY Collaborative Group	University of Oxford	26.10.2020	10.12.20
RECOVERY_UK	Data sharing statement	Dexamethasone in Hospitalized Patients with Covid-19 — Preliminary Report	The RECOVERY Collaborative Group	The New England Journal of Medicine	17.07.2020	10.12.20
RECOVERY_UK	Editorial	The RECOVERY Platform	Normand, SL	The New England Journal of Medicine	21.07.2020	11.12.20
RECOVERY_UK	Letter	The importance of increasing recruitment	Chief Medical Officers of Health	National Health Service	18.08.2020	10.12.20
RECOVERY_UK	Letter	The importance of COVID-19 clinical trials	Chief Medical	National Health Service	01.04.2020	10.12.20

			Officers of Health			
RECOVERY_UK	Letter	Recruiting patients for clinical trials for Covid-19 therapeutics	Chief Medical Officers of Health	National Health Service	06.05.2020	10.12.20
RECOVERY_UK	Letter	Request for support: Randomised evaluation of COVID-19 therapy (RECOVERY trial)	Department of Health & Social Care, NIHR	National Health Service	16.03.2020	10.12.20
RECOVERY_UK	Letter	Letter from Data Monitoring Committee December 3 2020	Data Monitoring Committee Chairman	University of Edinbourgh	03.12.2020	10.12.20
RECOVERY_UK	Minutes	200227_NERVTAG therapeutics sub committee minute_FINAL	NERVTAG	Government of the United Kingdom	27.02.2020	11.11.21
RECOVERY_UK	Minutes	NERVTAG_Member_Bios_update_July2021	NERVTAG	Government of the United Kingdom	07.01.2021	11.11.21
RECOVERY_UK	Minutes	200302_NERVTAG therapeutics subgroup Minutes_FINAL	NERVTAG	Government of the United Kingdom	03.02.2020	11.11.21
RECOVERY_UK	Minutes	200309_NERVTAG therapeutics subcommittee Minutes _FINAL	NERVTAG	Government of the United Kingdom	03.09.2020	11.11.21
RECOVERY_UK	Minutes	RECOVERY collaborators' meeting 7th & 8th December	The RECOVERY Collaborative Group	University of Oxford	08.12.2020	10.12.20
RECOVERY_UK	News	RECOVERY trial: the UK covid-19 study resetting expectations for clinical trials	Wilkinson, E	BMJ	28.04.2020	10.12.20

RECOVERY_UK	News	Coronavirus: world's biggest trial of drug to treat Covid-19 begins in UK	Boseley, S	The Guaridan	17.04.2020	10.12.20
RECOVERY_UK	News	Covid-19: The inside story of the RECOVERY trial	Wise, J & Coombes, R	BMJ	08.07.2020	10.12.20
RECOVERY_UK	News	One U.K. trial is transforming COVID-19 treatment. Why haven't others delivered more results?	Kupfersch midt, K	Science	02.07.2020	11.12.20
RECOVERY_UK	News	Pressure grows on UK to routinely treat Covid-19 patients with the blood of survivors after US grants it emergency approval - but scientists warn there is still no proof it works	Chalmers, V	The Daily Mail	24.08.2020	11.12.20
RECOVERY_UK	News	Covid-19: NHS hospitals are urged to recruit more patients to Recovery trial to find what treatments work	Iacobucci, G	BMJ	05.11.2020	11.12.20
RECOVERY_UK	News	First person to donate plasma after receiving plasma for COVID	NHS	NHS Blood and Transplant	05.11.2020	11.12.20
RECOVERY_UK	Poster	Have you been admitted to hospital with suspected or confirmed COVID-19?	The RECOVER Y Collaborati ve Group	University of Oxford	11.06.2020	10.12.20
RECOVERY_UK	Poster	Are you looking after a patient with COVID-19? Have they been admitted?	The RECOVER Y Collaborati ve Group	University of Oxford	14.04.2020	10.12.20
RECOVERY_UK	Poster	Quick guide to receiving conset	The RECOVER Y Collaborati ve Group	University of Oxford	08.07.2020	10.12.20
RECOVERY_UK	Poster	Quick guide to follow up	The RECOVER Y	University of Oxford	02.04.2020	10.12.20

			Collaborative Group			
RECOVERY_UK	Preprint	Convalescent plasma in patients admitted to hospital with COVID-19 (RECOVERY): a randomised, controlled, open-label, platform trial	The RECOVERY Collaborative Group	medRxiv	10.03.2021	13.4.21
RECOVERY_UK	Press release	RECOVERY trial closes recruitment to convalescent plasma treatment for patients hospitalised with COVID-19	The RECOVERY Collaborative Group	Nuffield Department of Population Health	15.01.2021	11.12.21
RECOVERY_UK	Protocol	Randomised Evaluation of COVID-19 Therapy (RECOVERY)	The RECOVERY Collaborative Group	University of Oxford	11.21.2020	10.12.20
RECOVERY_UK	Protocol	Supplementary Appendix: Protocol and statistical analysis plan	The RECOVERY Collaborative Group	The New England Journal of Medicine	17.07.2020	10.12.20
RECOVERY_UK	Publication	Dexamethasone in Hospitalized Patients with Covid-19 — Preliminary Report	The RECOVERY Collaborative Group	The New England Journal of Medicine	17.07.2020	10.12.20
RECOVERY_UK	Publication	Lopinavir–ritonavir in patients admitted to hospital with COVID-19 (RECOVERY): a randomised, controlled, open-label, platform trial	The RECOVERY Collaborative Group	The Lancet	05.10.2020	10.12.20
RECOVERY_UK	Publication	Effect of Hydroxychloroquine in Hospitalized Patients with Covid-19	The RECOVERY	The New England Journal of Medicine	19.11.2020	10.12.20

			Collaborative Group			
RECOVERY_UK	Publication supplement	Dexamethasone in Hospitalized Patients with Covid-19 — Preliminary Report	The RECOVERY Collaborative Group	The New England Journal of Medicine	17.7.2020	10.12.20
RECOVERY_UK	Study document	Sample randomisation form - convalescent plasma and monoclonal antibody	The RECOVERY Collaborative Group	University of Oxford	25.11.2020	10.12.20
RECOVERY_UK	Training material	RECOVERY intervention sheet - assessing patients for risk of transfusion associated circulatory overload (TACO) prior to convalescent plasma transfusions	The RECOVERY Collaborative Group	University of Oxford	n.d.	10.12.20
RECOVERY_UK	Training material	Convalescent plasma training powerpoint	The RECOVERY Collaborative Group	University of Oxford	11.707.2020	10.12.20
RECOVERY_UK	Trial registry record	Randomised Evaluation of COVID-19 Therapy (RECOVERY)	University of Oxford	EU Clinical Trials Register	19.03.2020	10.12.20
RECOVERY_UK	Trial registry record	Randomised Evaluation of COVID-19 Therapy (RECOVERY)	University of Oxford	ClinicalTrials.gov	11.05.2020	10.12.20
RECOVERY_UK	Trial registry record	A randomised trial of treatments to prevent death in patients hospitalised with COVID-19 (coronavirus)	University of Oxford	ISRCTN Registry	30.03.2020	10.12.20
RECOVERY_UK	Website	RECOVERY: Randomised Evaluation of COVID-19 Therapy	Nuffield Deparmtent of	University of Oxford	n.d.	10.12.20

			Population Health			
RECOVERY_UK	Website	For patients	The RECOVERY Collaborative Group	University of Oxford	10.12.2020	10.12.20
REMAP CAP_UK	Letter	Novel Coronavirus: Clinical Trials	Chief Medical Officers of Health UK	National Health Service	2020	18.01.22
REMAP CAP_UK	Letter	Recruiting patients for clinical trials for COVID-19 therapeutics	Chief Medical Officers of Health UK	National Health Service	06.05.2020	27.01.21
REMAP CAP_UK	News	COVID-19: NHS urges patients who beat coronavirus to keep donating blood plasma despite new findings	Moore, T	Sky News	11.01.2021	25.01.21
REMAP CAP_UK	News	Expert reaction to REMAP-CAP recruitment of severely ill COVID-19 patients into convalescent plasma trial being paused after initial analysis suggested it did not improve outcomes	Science Media Centre	Science Media Centre	11.01.2021	03.02.21
REMAP CAP_UK	Press release	Oxford University Press Release: Low-cost dexamethasone reduces death by up to one third in hospitalised patients with severe respiratory complications of COVID-19	The RECOVERY Collaborative Group	Oxford University	16.06.2020	27.01.21
REMAP CAP_UK	Protocol	Randomized, Embedded, Multifactorial Adaptive Platform trial for CommunityAcquired Pneumonia (REMAP-CAP): CORE PROTOCOL	REMAP-CAP	REMAP-CAP	10.07.2019	25.01.21
REMAP CAP_UK	Protocol	COVID-19 Immunoglobulin Therapy Domain-Specific Appendix Version 2.4.2 dated 23 July 2020	REMAP-CAP	REMAP-CAP	23.07.2020	03.02.21

REMAP CAP_UK	Protocol	COVID-19 Immunoglobulin Therapy Domain-Specific Appendix Version 1.01 dated 01 June 2020	REMAP-CAP	REMAP-CAP	01.06.2020	03.02.21
REMAP CAP_UK	Publication	Effect of Hydrocortisone on Mortality and Organ Support in Patients With Severe COVID-19 The REMAP-CAP COVID-19 Corticosteroid Domain Randomized Clinical Trial	The Writing Committee for the REMAP-CAP Investigators	JAMA	6.10.2020	27.01.21
REMAP CAP_UK	Publication	Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis	Mehra MR, Desai SS, Ruschitzka F, Patel, AM	The Lancet	22.05.2020	27.01.21
REMAP CAP_UK	Publication	A Trial of Lopinavir–Ritonavir in Adults Hospitalized with Severe Covid-19	Cao B, Wang Y, Wen D, et al	The New England Journal of Medicine	07.05.2020	27.01.21
REMAP CAP_UK	Publication	Retraction—Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis	Mandeep R M, Ruschitzka F, Patel A M	The Lancet	04.06.2021	27.01.21
REMAP CAP_UK	Publication supplement	Data Sharing Statement	The Writing Committee for the REMAP-CAP Investigators	JAMA	6.10.2020	03.02.21
REMAP CAP_UK	Social media	Important Results coming out of #convalescent plasma	Miflin, G	Twitter	11.01.2021	25.01.21

REMAP CAP_UK	Trial registry record	Randomized, Embedded, Multifactorial Adaptive Platform Trial for Community- Acquired Pneumonia (REMAP-CAP)	Derde, L, UMC Utrecht	ClinicalTrials.gov	04.13.2016	18.01.21
REMAP CAP_UK	Trial registry record	An international platform trial for severely ill patients with community-acquired pneumonia or COVID-19	Albeidh, F	ISRCTN Registry	20.7.2020	18.01.21
REMAP CAP_UK	Trial registry record	Randomized, Embedded, Multifactorial, Adaptive Platform trial for Community-Acquired Pneumonia (REMAP-CAP). (COVID-19)	REMAP-CAP	EU Clinical Trials Register	09.16.2015	
REMAP CAP_UK	Website	Community-Acquired Pnemonia	REMAP-CAP	REMAP-CAP	n.d.	18.01.21
REMAP CAP_UK	Website	COVID-19 Publications	REMAP-CAP	REMAP-CAP	n.d.	25.01.21
REMAP CAP_UK	Website	Pandemic Preparedness	REMAP-CAP	REMAP-CAP	2020	18.01.21
REMAP CAP_UK	Website	Participating Sites	REMAP-CAP	REMAP-CAP	2020	18.01.21
REMAP CAP_UK	Website	5. PRACTICE C: RANDOMIZED, EMBEDDED, MULTIFACTORIAL, ADAPTIVE PLATFORM TRIAL SEVERE CAP –WORKPACKAGE 5	PREPARE EUROPE	PREPARE EUROPE	n.d.	28.01.21
REMAP CAP_UK	Website	Study Detail: Randomized, Embedded, Multifactorial, Adaptive Platform trial for Community-Acquired Pneumonia	National Institute for Health Research	National Institute for Health Research	15.01.2021	18.01.21
REMAP CAP_UK	Website	REMAP-CAP: Corticosteroids in COVID-19	Walker, G	The Bottom Line	11.09.2020	03.02.21
REMAP CAP_UK	Website	REMAP-CAP response to the COVID-19 pandemic	REMAP-CAP	REMAP-CAP	n.d.	18.01.21
REMAP CAP_UK	Website	Who can donate plasma?	NHS Blood and Transplant	NHS Blood and Transplant	n.d.	03.02.21
REMAP CAP_UK	Website	What is an adaptive clinical trial?	REMAP-CAP	REMAP-CAP	n.d.	18.01.21