



eunethta
EUROPEAN NETWORK FOR HEALTH TECHNOLOGY ASSESSMENT

EUnetHTA Joint Action 3 WP4

“Rolling Collaborative Review” of Covid-19 treatments

ASPIRIN FOR THE TREATMENT OF COVID-19

Project ID: RCR23
Monitoring Report

Version 1.0, February 2021

Template version November 2020



This Rolling Collaborative Review Living Document is part of the project / joint action '724130 / EUnetHTA JA3' which has received funding from the European Union's Health Programme (2014-2020)

DOCUMENT HISTORY AND CONTRIBUTORS

Version	Date	Description of changes
V 1.0	17/02/2021	First version

Major changes from previous version

Chapter, page no.	Major changes from version [X.0]
	<ul style="list-style-type: none">Not applicable

Disclaimer

The content of this “Rolling Collaborative Review” (RCR) represents a consolidated view based on the consensus within the Authoring Team; it cannot be considered to reflect the views of the European Network for Health Technology Assessment (EUnetHTA), EUnetHTA’s participating institutions, the European Commission and/or the Consumers, Health, Agriculture and Food Executive Agency or any other body of the European Union. The European Commission and the Agency do not accept any responsibility for use that may be made of the information it contains.

Rolling Collaborative Review team

Author(s)	Swiss Network for Health Technology Assessment (SNHTA), Switzerland
Co-Author(s)	Department of Epidemiology Lazio Regional Health Service (DEPLazio), Italy

Further contributors

Project Management	
Zorginstituut Nederland (ZIN), Netherlands	Coordination between involved parties throughout the assessment
Austrian Institute for Health Technology Assessment (AIHTA), Austria	Coordination of RCR

Conflict of interest

All authors and co-authors involved in the production of this living document have declared they have no conflicts of interest in relation to the technology and comparator(s) assessed according to the EUnetHTA declaration of interest (DOI) form. Conflict of Interest was evaluated following the [EUnetHTA Procedure Guidance for handling DOI form \(https://eunetha.eu/doi\)](https://eunetha.eu/doi).

Copyright

EUnetHTA assessments are published under a “CC/BY/NC” [Creative Commons Licence](https://creativecommons.org/licenses/by-nc/4.0/).



How to cite this assessment

Please cite this assessment as follows:

EUnetHTA Rolling Collaborative Review (RCR23). Authoring Team. Aspirin for the treatment of COVID-19. Diemen (The Netherlands): EUnetHTA; 2021. [date of citation]. 35 pages. Report No.: RCR23, V1.0. Available from: [https //www.eunetha.eu](https://www.eunetha.eu).

Contact the EUnetHTA Secretariat EUnetHTA@zinl.nl with inquiries about this assessment.

TABLE OF CONTENTS

DOCUMENT HISTORY AND CONTRIBUTORS	2
TABLE OF CONTENTS	4
LIST OF TABLES AND FIGURES	4
1 OBJECTIVE	6
2 METHODS	6
2.1 <i>SCOPE</i>	6
2.2 <i>SOURCES OF INFORMATION</i>	8
3 ABOUT THE TREATMENT	10
3.1 <i>MODE OF ACTION</i>	10
3.2 <i>REGULATORY STATUS</i>	10
3.3 <i>LEVEL OF EVIDENCE</i>	11
4 SUMMARY	11
4.1 <i>EFFECTIVENESS AND SAFETY EVIDENCE FROM RCTS</i>	11
4.2 <i>SAFETY EVIDENCE FROM OBSERVATIONAL STUDIES</i>	11
4.3 <i>ONGOING STUDIES</i>	11
4.4 <i>SCIENTIFIC CONCLUSION ABOUT STATUS OF EVIDENCE GENERATION</i>	12
5 REFERENCES	25
6 APPENDIX	27
6.1 <i>SEARCH STRATEGY TO IDENTIFY RANDOMISED CONTROLLED TRIALS</i>	27
6.2 <i>SEARCH STRATEGY TO IDENTIFY OBSERVATIONAL STUDIES</i>	30
6.3 <i>SEARCH STRATEGY TO IDENTIFY ONGOING STUDIES</i>	33
6.4 <i>FLOW DIAGRAMS</i>	34

LIST OF TABLES AND FIGURES

Table 2-1 Scope of the RCR	6
Table 4-1 Summary of safety from observational studies (AE and SAE) of combination therapy with Aspirin.....	13
Table 4-2 Ongoing platform RCTs involving Aspirin	15
Table 4-3 Ongoing platform RCTs involving Aspirin, continued.....	16
Table 4-4 Ongoing trials of single agent: Aspirin.....	18
Table 4-5 Ongoing trials of single agent: Aspirin, continued.....	20
Table 4-6 Ongoing trials of single agent: Aspirin, continued.....	21
Table 4-7 Ongoing trials of combination therapies including Aspirin	22
Table 4-8 Ongoing observational studies evaluating effect of aspirin.....	23
Table 6-1 Search strategy to identify randomised controlled studies.....	28
Table 6-2 Search strategy to identify observational studies.....	30
Table 6-3 Search strategy to identify ongoing studies	33
Appendix Figure 6-1. Flow diagram depicting the selection process of RCTs.....	34
Appendix Figure 6-2. Flow diagram depicting the selection process of observational studies	35

LIST OF ABBREVIATIONS

AE	Adverse Event
BID	Bis in die (twice daily)
CI	Confidence Interval
COVID-19	Coronavirus disease 2019
CTRI	Clinical Trials Registry - India
DOI	Declaration of interest
EMA	European Medicines Agency
EUCTR	European Union Clinical Trials Register
EudraCT	European Union Drug Regulating Authorities Clinical Trials Database
EUnetHTA	European Network of Health Technology Assessment
GRADE	Grading of Recommendations, Assessment, Development and Evaluation
HR	Hazard Ratio
HRQOL	Health-related Quality of Life
ICD	International Classification of Diseases
ICU	Intensive care unit
IRCT	Iranian Registry of Clinical Trials
ISRCTN	International Standard Randomised Controlled Trial Number
IU	International unit
kg	kilogram
MD	Mean Difference
MeSH	Medical Subject Headings
mg	milligram
NA	Not applicable
NCT	National Clinical Trial number (Clinicaltrials.gov)r
NR	Not reported
OR	Odds Ratio
PACTR	Pan African Clinical Trials Registry
PCR	Polymerase Reaction Chain
PO	Per os
RCT	Randomized Controlled Trial
RCR	Rolling Collaborative Review
REA	Relative Effectiveness Assessment
RR	Relative Risk
SAE	Serious Adverse Event
SARS	Severe acute respiratory syndrome
SD	Standard Deviation
SMD	Standardized Mean Difference
SNHTA	Swiss Network for Health Technology Assessment
SoC	Standard of care
SOF	Summary of Findings
SOP	Standard Operating Procedure
WP4	Work Package 4
WHO	World Health Organisation

1 OBJECTIVE

The aim of this EUnetHTA Rolling Collaborative Review is

- to inform health policy at the national/regional and at the European level at an early stage in the life-cycle of therapies which interventions are currently undergoing clinical trials,
- to monitor (ongoing studies and their results) permanently - in the format of a Living Document - potential therapies against covid-19,
- to present comparative data on effectiveness and safety of potential therapies and
- to support preparations for an evidence-based purchasing of regional/ national health politicians, if necessary.

To avoid redundancies and duplication, the EUnetHTA Rolling Collaborative Review will reuse sources from international initiatives to collect information and data on Covid-19 treatments.

The scope of the Rolling Collaborative Review is of descriptive nature. These **EUnetHTA Rolling Collaborative Reviews are not meant to substitute a joint Relative Effectiveness Assessment (REA)** adhering to the agreed procedures and aiming at critical appraisal of the clinical evidence based on the Submission Dossier submitted by the (prospective) Marketing Authorization Holder (MAH).

2 METHODS

This Rolling Collaborative Review is prepared according to the project plan (“Rolling Collaborative Review (RCR) on Covid-19 treatments: Project description and planning”, published [on the EUnetHTA website](#)) and will be updated monthly. Monthly updates are published on the EUnetHTA Covid-19 Website (<https://eunetha.eu/covid-19-treatment/>) and on the EUnetHTA Rolling Collaborative Review Sharepoint page each 15th of the month.

2.1 Scope

Table 2-1 Scope of the RCR

Description	Project Scope
<p>Population</p>	<p>Disease</p> <ul style="list-style-type: none"> • SARS-CoV-2 is a novel coronavirus causing a respiratory illness termed Covid-19. The full spectrum of Covid-19 ranges from mild, self-limiting respiratory tract illness to severe progressive pneumonia, multi-organ failure, and death. <p>ICD-Codes (https://www.who.int/classifications/icd/covid19/en)</p> <ul style="list-style-type: none"> • An emergency ICD-10 code of ‘U07.1 COVID-19, virus identified’ is assigned to a disease diagnosis of COVID-19 confirmed by laboratory testing. • An emergency ICD-10 code of ‘U07.2 COVID-19, virus not identified’ is assigned to a clinical or epidemiological diagnosis of COVID-19 where laboratory confirmation is inconclusive or not available. • Both U07.1 and U07.2 may be used for mortality coding as cause of death. See the International guidelines for certification and classification (coding) of COVID-19 as cause of death following the link below. • In ICD-11, the code for the confirmed diagnosis of COVID-19 is RA01.0 and the code for the clinical diagnosis (suspected or probable) of COVID-19 is RA01.1. <p>MeSH-terms</p> <ul style="list-style-type: none"> • COVID-19, Coronavirus Disease 2019 <p>Target population (https://www.covid19treatmentguidelines.nih.gov/overview/management-of-covid-19/)</p>

	<ul style="list-style-type: none"> Asymptomatic or pre-symptomatic Infection: Individuals who test positive for SARS-CoV-2 by virologic testing using a molecular diagnostic (e.g., polymerase chain reaction) or antigen test, but have no symptoms. Mild Illness: Individuals who have any of the various signs and symptoms of COVID 19 (e.g., fever, cough, sore throat, malaise, headache, muscle pain) without shortness of breath, dyspnoea, or abnormal chest imaging. Moderate Illness: Individuals who have evidence of lower respiratory disease by clinical assessment or imaging and a saturation of oxygen (SpO₂) ≥94% on room air at sea level. Severe Illness: Individuals who have respiratory frequency >30 breaths per minute, SpO₂ <94% on room air at sea level, ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO₂/FiO₂) <300 mmHg, or lung infiltrates >50%. Critical Illness: Individuals who have respiratory failure, septic shock, and/or multiple organ dysfunction.
Intervention	<p>Aspirin, active substance: acetylsalicylic acid (ASA). Any generic equivalent of ASA. Oral intake.</p> <p>MESH terms: aspirin</p>
Comparison	<p>Any active treatment, placebo, or standard of care.</p> <p>Rationale: Since there is no gold standard treatment any comparator is acceptable as well as the above listed interventions.</p>
Outcomes	<p><u>Main outcome:</u></p> <ul style="list-style-type: none"> All-cause Mortality (Survival) <p><u>Additional Outcomes:</u></p> <p>Efficacy:</p> <ul style="list-style-type: none"> Length of hospital stay, Viral burden (2019-nCoV RT-PCR negativity), Clinical progression (WHO Clinical Progression Scale measured daily over the course of the study), Rates of hospitalization and of patients entering ICU, Duration of mechanical ventilation, Quality of life. <p>Safety:</p> <ul style="list-style-type: none"> Adverse events (AE), Severe adverse events (SAE), Withdrawals due to AEs, Most frequent AEs, Most frequent SAEs. <p>Rationale: We will give priority according to the Core Outcome Set for Clinical Trials on Coronavirus Disease 2019 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7102592/pdf/main.pdf) and A minimal common outcome measure set for COVID-19 clinical research from the WHO Working Group on the Clinical Characterisation and Management of COVID-19 infection.</p>
Study design	<p>Efficacy: randomised controlled trials (RCT)</p> <p>Safety: observational studies (comparative or single-arm prospective studies and registries)</p>

2.2 Sources of information

According to the project plan, this Rolling Collaborative Review is based on three main sources of information, as described below:

1. Summary of findings(SoF) table for published RCTs related to effectiveness and safety:

This table is based on the living systematic review and Network Meta-Analysis (NMA) created by the partnering institute of DEPLazio: [find the PROSPERO protocol here](#). DEPLazio provides updates for the SoF table on a monthly basis to the EUnetHTA partners authoring the respective Rolling CR documents who are integrating this information accordingly.

The literature search is conducted in the following databases:

- PubMed
- MEDLINE, accessed via OVID
- Embase, accessed via OVID

Population	People affected by COVID-19, as defined by the authors of the studies. No limits in terms of gender or ethnicity. SARS-CoV-2 is a novel coronavirus causing a respiratory illness termed Covid-19. It started spreading in December 2019, and was declared a pandemic by the World Health Organisation on 11th March 2020. The full spectrum of Covid-19 ranges from mild, self-limiting respiratory tract illness to severe progressive pneumonia, multi-organ failure, and death.
Intervention	Interventions for the treatment of people affected by COVID-19, including pharmacological interventions (e.g. antibiotics, antibodies, antimalarial, antiviral, antiretroviral, immune-suppressors/modulators, kinase inhibitors) and their combinations.
Comparison	Any active treatment, placebo, or standard of care.
Outcomes	All-cause mortality Additional outcomes: Length of hospital stay, 2019-nCoV RT-PCR negativity, PaO ₂ /FiO ₂ , Duration of mechanical ventilation, radiological imaging, Adverse events, Severe adverse events.
Study design	Randomised controlled trials (RCT); no restriction on language of publication

To identify preprints of preliminary reports of work that have not been peer-reviewed, the following sources are searched:

- medRxiv Health Sciences
- bioRxiv Biology

In addition to the sources and strategies described above, registers of ongoing studies are screened. Key conferences and conference proceedings are considered. Appendix Table 6-1 describes in detail the sources searched, the search terms used and the dates at which the searches are executed.

Data extraction, Risk of bias assessment, data synthesis:

Two reviewers from DEPLazio are screening search results, assessing full texts of studies and extract study characteristics and outcome data according to pre-defined criteria. The process of study selection is depicted as a flow diagram in Appendix Figure 6-1.

Risk of bias is assessed using the criteria outlined in the Cochrane Handbook for Systematic Reviews of Interventions [1].

Dichotomous outcomes are analysed by calculating the relative risk (RR) for each trial with the uncertainty in each result being expressed by its 95% confidence interval (CI). Continuous outcomes are analysed by calculating the mean difference (MD) with the relative 95% CI when the study used the same instruments for assessing the outcome.

The standardised mean difference (SMD) is applied when studies used different instruments. Pairwise meta-analyses is performed for primary and secondary outcomes using a random-effects model in RevMan for every treatment comparison [2]. Network meta-analysis (NMA) is performed for the primary outcome. For rating the certainty of the evidence, the GRADE approach is being used [3].

- Sources: <http://deplazio.net/farmacicoVID/index.html> for SoF (or <https://covid-nma.com/>)

2. Table(s) on published (peer reviewed) observational studies for safety results:

The literature search is conducted on a monthly basis.

The sources and search methods are described in more detail in Appendix Table 6-2.

Population	See project Scope
Intervention	Aspirin, active substance: acetylsalicylic acid (ASA). Any generic equivalent of ASA. Oral intake. MESH terms: aspirin
Comparison	Any active treatment, placebo, or standard of care.
Outcomes	See project Scope
Study design	Inclusion criteria: Prospective non-randomised controlled trials, prospective case series (i.e. comparative or single-arm prospective studies), registries Exclusion criteria: retrospective studies, case studies/ case reports, observational studies that do not report safety data

Two researchers from NIPHNO carry out title and abstract screening and assess the full texts of all potentially eligible studies. The study selection process is depicted in a flow diagram (Appendix Figure 6-2).

One researcher of SNHTA extracts the data and assesses the risk of bias using Robins-I (<https://training.cochrane.org/handbook/current/chapter-25>). For prospective single arm studies the Johanna Briggs tool for prevalence studies is used to assess the methodological rigor and applicability [4].

Results are presented in tabular form for all included studies.

3. Table(s) on ongoing trials:

The following clinical trial registries are searched on a monthly basis:

- ClinicalTrials.gov: <https://clinicaltrials.gov/>
- ISRCTN: <https://www.isrctn.com/>
- European Clinical Trials Registry: <https://www.clinicaltrialsregister.eu/>

Inclusion criteria: Randomised controlled trials, Controlled trials

One researcher of SNHTA is searching and extracting the data for the eligible studies. At the drafting stage of each update, the author team verifies whether the status of previously identified studies has changed. This is done by verifying the date of the last update posted in the trial registers. In addition, trial register IDs of all previously identified studies are entered in both PubMed and Google

(google.com) to verify if previously identified studies have been published since the last update. In Google, the first 10 hits are screened for this purpose.

Search methods are described in more detail in Table 6-3.

Data are presented in tabular form.

3 ABOUT THE TREATMENT

3.1 *Mode of Action*

Aspirin with active substance acetylsalicylic acid belongs to the drug group non-steroidal anti-inflammatory drugs and is a nonselective cyclooxygenase inhibitor [5]. Salicylic acid is the most important active metabolite of aspirin. It is produced by plants upon infection with pathogens and in particular viruses [6, 7]. The production of salicylic acid in turn mediates resistance to viral replication, intercellular spread and systemic movement through so-called pathogenesis-related proteins including the protein Coronatine Insensitive [6]. Aspirin is expected to stimulate cell-autonomous immunity against viral infection.

Apart from its capability to inhibit virus replication and its anti-inflammatory potential, acetylsalicylic acid has analgesic and antipyretic properties. The peripheral analgesic effect is due to the inhibition of cyclooxygenase. This inhibits the formation of prostaglandins (E2 and I2), which are involved in the development of pain [8]. The antipyretic effect is due to a central action on the hypothalamic temperature-regulating centre, resulting in peripheral dilatation of skin vessels with sweating and heat loss [8].

An additional mechanism of action is based on anti-platelet aggregation. Acetylsalicylic acid has an antithrombotic effect by inhibiting thromboxane A2 synthesis in platelets [9]. Accumulating data suggests COVID-19 to be profoundly prothrombotic. Microthrombosis due to a hypercoagulable state has been repeatedly reported in patients with COVID 19 [10]. Furthermore, the likelihood of progressing to severe disease and COVID-19 severity appears to be in part driven by direct injury to the cardiovascular system. Due to its anti-thrombotic effects, cardioprotective and lung-injury protective effects of aspirin in COVID-19 are expected.

3.2 *Regulatory Status*

Aspirin, produced by Bayer, is not currently approved for the treatment of COVID-19[11]. Beside the Brand-name "Aspirin" there are generic equivalents of acetylsalicylic acid on the market, but they have the same therapeutic indications and limitations as the original "Aspirin" (e.g. Alcacyl, Aspégic, Aspro, ASS Cardio Mepha). It is approved for the treatment of mild to moderately severe acute pain (headache, toothache, pain in the area of joints and ligaments, back pain) and for symptomatic treatment of fever and/or pain in colds. In adolescents aged 12 years and over, aspirin is indicated only after a doctor's prescription and only as a second-line treatment. Aspirin chewable tablets and granules are approved for self-medication for short-term treatment of a maximum of 3 days. Aspirin is marketed as Aspirin, Aspirin-C, Aspirin S, Aspirin Complex and Aspirin 500 Instant-tablets. In children aged 9 years and over and in adolescents, aspirin-C is approved only after a doctor's prescription and only as a second-line treatment (swissmedicinfo.ch).

Aspirin Cardio 100, Aspirin Cardio 300 of Bayer are approved for the following indication (swissmedicinfo.ch):

- Thrombosis prevention (reocclusion prophylaxis) after aortocoronary bypass, percutaneous transluminal coronary angioplasty (PTCA) and arteriovenous shunt in dialysis patients.
- Prophylaxis of cerebrovascular insults after precursor stages have occurred (transient ischaemic attacks, TIA).
- Reduction of the risk of further coronary thrombosis after a heart attack (reinfarction prophylaxis).

- Myocardial infarction prophylaxis in conjunction with other therapeutic measures in patients with a very high cardiovascular risk according to the benefit-risk assessment by the attending physician.
- Unstable angina pectoris.
- Prophylaxis of arterial thrombosis after vascular surgery.
- In acute myocardial infarction, as part of standard therapy.
- Prevention of vascular occlusion in arterial occlusive disease.

3.3 Level of Evidence

We did not identify any RCT with published outcome data in any of the sources searched (Table 6-1).

The search by NIPHNO identified one study that was excluded because of sample size being below 50 (Table 6-2) [12]. The search in trial registries identified one study to which a non-peer reviewed preprint report was found when using the trial registration number as search term in google.com (IDEA; NCT04425863) [10]. This single arm prospective study conducted in Argentina has documented the effectiveness and safety of Aspirin, the study and eligible safety data are described in Table 4-1. This study evaluated a combined therapy of 24 mg Ivermectin plus 250 mg Aspirin in outpatients with mild COVID-19 cases. The study also evaluated Ivermectin, Dexamethasone, Aspirin and oxygen therapy in hospitalized patients with moderate COVID-19 and another combination therapy without aspirin in patients with severe symptoms. The outcome data from the sample with moderate COVID-19 symptoms could not be extracted as the authors reported all outcome data for the combined group with moderate and severe symptoms.

We identified 22 reports to 15 ongoing studies in international clinical trial registries and through searching other sources.

4 SUMMARY

4.1 Effectiveness and Safety evidence from RCTs

None of the RCTs identified in trial registries has posted outcome data in any of the sources searched.

4.2 Safety evidence from observational studies

In one single arm prospective study at high risk of bias that evaluated a combined therapy of 24 mg Ivermectin + 250 mg aspirin in outpatients with mild COVID-19 cases, none of the 135 patients experienced a serious adverse event (SAE), none was withdrawn because of a SAE and none died because of a SAE.

4.3 Ongoing studies

Searches in clinical trial registries resulted in the identification of 45 entries, the search at covid-nma.com in 10 entries (Table 6-3). An additional three reports were found when using trial acronyms and clinical trial registration numbers in google.com, scholar.google.com and pubmed.gov. After deduplication, 22 reports to 15 ongoing studies were included. One ongoing RCT was excluded as aspirin was provided in all trial arms (LEAD COVID-19; NCT04363840). The LEAD COVID-19 trial evaluates aspirin and vitamin D in vitamin D deficient COVID-19 patients and will be addressed in EUnetHTA RCR20 [13]. The 15 included trials involved 4 platform adaptive RCTs (Table 4-2); eight studies evaluating aspirin as a single agent (Table 4-4), two studies evaluating a combination therapy with aspirin (Table 4-7) and one observational study where it is not yet clear if eligible safety data will be addressed (Table 4-8). Two platform randomized trials and 1 RCT recruited (part of) the patients in Europe. Eleven of the 13 ongoing

RCTs evaluated Aspirin in daily doses of 75 to 160mg. Latter doses are typically used to obtain antiplatelet effects and are used for cardioprotection. One RCT used a lower dose by using Aggrenox twice daily for a total daily dose of 400 mg Dipyridamole and 50mg aspirin (NCT04410328). The remaining trial used a daily dose of 325 mg, a dosage used to elicit both antiplatelet and anti-inflammatory action (CTRI/2020/09/028088). The severity of COVID-19 in the study population varied between trials, the majority studied hospitalized patient with moderate to critical COVID-19, one RCTs focused on outpatients (NCT04498273) and another on both outpatients and hospitalized patients (NCT04324463).

4.4 Scientific conclusion about status of evidence generation

The current evidence is not sufficient to support the use of aspirin for COVID-19.

Table 4-1 Summary of safety from observational studies (AE and SAE) of combination therapy with Aspirin

Author, year	Carvallo 2020 [10]; NCT04425863; IDEA
Country	Argentina
Sponsor/ lead institution	Eurmekian Public Hospital, Buenos Aires, Argentina
Intervention/Product (drug name)	Mild cases: Ivermectin + aspirin, outpatient treatment Moderate cases: Ivermectin, Dexamethasone, aspirin and Low Flow Washed Oxygen or Oxygen Concentrator, inpatient treatment Severe cases: Ivermectin, Dexamethasone, enoxaparin and inpatient treatment with mechanical ventilation in ICU.
Dosage	Ivermectin on day 0 (day the patient starts treatment) and 7: Mild: 25 mg, oral; Moderate 36 mg, oral; Severe 48 mg via gastric cannulae Aspirin: 250 mg tablets, 1 table daily for 30 days Dexamethason: 4-mg injection daily until discharge Enoxaparin: injection 100 IU/kg (ca. 1 mg/kg) daily until transfer to ward care
Comparator	None**
Study design	Prospective single center uncontrolled cohort. Recruitment from May to July 2020.
Setting	Outpatient, hospital ward & ICU
Number of pts	N=167
Inclusion criteria	Patients with positive oral/nasal swabs; able to provide informed consent; not enrolled in another clinical study
Exclusion criteria	Children under 5 years old; pregnant women; previous reports of allergy to any of the drugs used in the clinical trial
Age of patients (yrs)	Mild: 55.7 years; 48.5% females Moderate to severe: 59.7 years; 57.5% females
Disease severity	Mild to severe symptoms
Follow-up (months)	Up to 30 days
Loss to follow-up, n (%)	None reported
RoB**	High RoB. Unclear sampling methods, too small sampe size to measure safety outcomes, non-standard definitions of COVID-19 severity. In addition to the JBI criteria, concerns raised regarding selective outcome reporting as data for moderate and severe samples were reported jointly. As the study sample with severe symptoms did not receive Aspirin, outcome data on SAE for this joint group could not be considered.
Safety – Outcomes	
Overall AEs, n (%)	-
Serious AE (SAE), n (%)	Treatment related SAE: Mild: 0 / 135
Most frequent AEs n (%)	-
Most frequent SAEs, n (%)	-
AEs of special interest, n (%)	-

Author, year	Carvallo 2020 [10]; NCT04425863; IDEA
Death as SAE, n (%)	Mild: 0 / 135; Moderate to severe: 0 / 32
Withdrawals due AEs, n (%)	Mild: 0 / 135; Moderate to severe: 0 / 32

* The authors descriptively compare the outcome data with external controls and published data, which are both ignored in this report

** by arms, if available, (Robins-I): <https://training.cochrane.org/handbook/current/chapter-25>; for single arm studies the JBI checklist for prevalence studies is used[4].

Abbreviations: n=number; yrs=years; RoB=risk of bias AE=adverse event; SAE=serious adverse events;.

Table 4-2 Ongoing platform RCTs involving Aspirin

Trial Identifier/registry ID(s)/contact	NCT04381936 / EudraCT2020-001113-21-GB / ISRCTN50189673 RECOVERY Contact: Contact: Richard Haynes; +44 (0)1865 743743; recoverytrial@ndph.ox.ac.uk	NCT04483960 ASCOT-ADAPT Contact: Naomi Perry ;+61 3 83442647; naomi.perry@unimelb.edu.au	NCT04498273 ACTIV4-Outpatient Contact: Jean Connors(617) 732-5190; jconnors@bwh.harvard.edu
Study design, study phase	Phase 2/3 RCT, multicentre open label adaptive platform trial with factorial assignment	Phase 3 RCT, multicentre open label adaptive platform trial with factorial assignment Pharmacological and standard of care comparators.	Phase 3 RCT, multicentre quadruple blinded adaptive platform trial with parallel assignment Pharmacological and standard of care comparators Masing: Participant, Care Provider, Investigator, Outcomes Assessor
Recruitment status	Recruiting (last update at trial registry on 10 Feb. 2021)	Recruiting (last update at trial registry on 25 Jan. 2021)	Recruiting (last update at trial registry on 5 Nov. 2020)
Number of Patients, Disease severity*	40'000 Disease severity: not specified	2'400 Non critical	7'000 Mild-Moderate
Setting (hospital, ambulatory,..)	Hospital	Hospital	Outpatient
Intervention (generic drug name and dosage)**	<ul style="list-style-type: none"> • Lopinavir-Ritonavir • Corticosteroid • Hydroxychloroquine • Azithromycin • Biological: Convalescent plasma • Tocilizumab • Biological: Immunoglobulin • Synthetic neutralising antibodies • Aspirin: 150 mg by mouth (or nasogastric tube) or per rectum once daily until discharge, for adults ≥18 years old. • Colchicine • Baricitinib • Anakinra 	<ul style="list-style-type: none"> • Nafamostat Mesilate • Biological: Convalescent plasma • Enoxaparin • Dalteparin • Tinzaparin • Aspirin: In addition to standard dose thromboprophylaxis, patients randomised to this arm will also receive 100mg aspirin daily. 	Apixaban 2.5 MG Apixaban 5MG Aspirin: low dose aspirin 81mg oral, twice daily for 45 days
Comparator (standard care or generic drug name and dosage)	Standard care: usual hospital care	<ul style="list-style-type: none"> • Anticoagulation - standard dose thromboprophylaxis: low molecular weight heparin, choice of agent 	Placebo

Trial Identifier/registry ID(s)/contact	NCT04381936 / EudraCT2020-001113-21-GB / ISRCTN50189673 RECOVERY Contact: Contact: Richard Haynes; +44 (0)1865 743743; recoverytrial@ndph.ox.ac.uk	NCT04483960 ASCOT-ADAPT Contact: Naomi Perry ;+61 3 83442647; naomi.perry@unimelb.edu.au	NCT04498273 ACTIV4-Outpatient Contact: Jean Connors(617) 732-5190; jconnors@bwh.harvard.edu
		according to availability and local practice at the participating site. <ul style="list-style-type: none"> Other pharmacological interventions and standard of care as listed above 	
Primary Outcome(s)	All-cause mortality [Time Frame: Within 28 days after randomisation]	Proportion of participants alive and not having required new intensive respiratory support (invasive or non-invasive ventilation) or vasopressors/inotropic support [Time Frame: 28 days]	Composite endpoint of need for hospitalization for cardiovascular/pulmonary events, symptomatic deep venous thrombosis, pulmonary embolism, arterial thromboembolism, myocardial infarction, ischemic stroke, and all-cause mortality for up to 45 days after initiation of assigned treatment.
Sponsor/ lead institution, country (also country of recruitment if different)	University of Oxford, UK	University of Melbourne/ The Peter Doherty Institute for Infection and Immunity; Australasian Society for Infectious Diseases	University of Pittsburgh, USA

*Mixed COVID-19, Mild, Moderate, Severe, Critical COVID-19

** Description on dose and route of administration for interventions other than aspirin are found on the trial registration site.

Abbreviations: see list of abbreviation on page 5.

Table 4-3 Ongoing platform RCTs involving Aspirin, continued

Trial Identifier/registry ID(s)/contact	NCT02735707 / EudraCT: 2015-002340-14-IT REMAP—COVID Contact: Cameron Green; info@remapcap.org
Study design, study phase	Phase 4 Randomized, Embedded, Multifactorial Adaptive Platform Trial Masking: none
Recruitment status	Recruiting (last update at trial registry at 12 Oct. 2020)
Number of Patients, Disease severity*	N=7100 in main trial, N=unclear in COVID-19 sub-platform Severe to critical
Setting (hospital, ambulatory,..)	Hospital, ICU

Trial Identifier/registry ID(s)/contact	NCT02735707 / EudraCT: 2015-002340-14-IT REMAP—COVID Contact: Cameron Green; info@remapcap.org
Intervention (generic drug name and dosage)**	<ul style="list-style-type: none"> • Aspirin administered at either 75mg or 100mg once per day for 14 days or until hospital discharge, whichever occurs first Other active trial arms • Fixed-duration Hydrocortisone • Shock-dependent hydrocortisone • Ceftriaxone • Moxifloxacin or Levofloxacin • Piperacillin-tazobactam • Ceftaroline • Amoxicillin-clavulanate • Macrolide administered for 3-5 days • Macrolide administered for up to 14 days • Five-days oseltamivir • Ten-days oseltamivir • Lopinavir/ritonavir • Hydroxychloroquine • Hydroxychloroquine + lopinavir/ritonavir • Interferon-β1a • Anakinra • Fixed-duration higher dose Hydrocortisone • Tocilizumab • Sarilumab • Vitamin C • Therapeutic anticoagulation • Simvastatin • Biological: Convalescent plasma • Other: Protocolised mechanical ventilation strategy • Eritoran • Apremilast Clopidogrel, Prasugrel or Ticagrelor
Comparator (standard care or generic drug name and dosage)	<ul style="list-style-type: none"> • No intervention: patients will not receive any antiplatelet agent or NSAID for 14 days while patient remains in hospital Active comparator: P2Y12 inhibitor, patients will receive either clopidogrel, prasugrel, or ticagrelor (as per site preference).
Primary Outcome(s)	<ul style="list-style-type: none"> • All-cause mortality [Time Frame: Day 90] Days alive and not receiving organ support in ICU [Time Frame: Day 21]
Sponsor/ lead institution, country (also country of recruitment if different)	MJM Bonten, , UMC Utrecht, the Netherlands Recruitment in USA, Australia, Belgium, Canada, Croatia, Germany, Hungary, Ireland, the Netherlands; New Zealand, Portugal, Romania, Spain, United Kingdom

*Mixed COVID-19, Mild, Moderate, Severe, Critical COVID-19

** Description on dose and route of administration for interventions other than aspirin are found on the trial registration site.

Trial Identifier/registry ID(s)/contact	NCT02735707 / EudraCT: 2015-002340-14-IT REMAP—COVID Contact: Cameron Green; info@remapcap.org
--	---

Abbreviations: see list of abbreviation on page 5.

Table 4-4 Ongoing trials of single agent: Aspirin

Trial Identifier/registry ID(s)/contact	CTRI/2020/07/026791[14] RESIST Deepti Siddharthan; 9968774019; deeptikailath@gmail.com	NCT04365309 PEAC Contact: Cai Yue; the first affiliated hospital of the Air force medical university	NCT04324463 ACT COVID-19 Contact: ACT COVID-19 Study Coordinator; 905-297-3479; ACT.ProjectTeam@PHRI.ca
Study design, study phase	Phase 2/3 RCT. Single center 4-arm open label trial with parallel group assignment Randomisation: computer-generated permuted block randomization with mixed block size Concealment: Sequentially numbered, sealed, opaque envelopes	Phase 2-3 Randomized controlled trial with parallel group assignment Masking: none	Two parallel randomised controlled trials Outpatient trial: 2x2 factorial design Inpatient trial: 2x2x2 factorial design Masking: none
Recruitment status	Open to recruitment (last update at trial registry at 11 Oct. 2020)	Enrolling by invitation (last update at trial registry at 28 April 2020)	Recruiting (last update at trial registry at 8 Oct. 2020)
Number of Patients, Disease severity*	N=800 Non-critical	N=128 Moderate to severe COVID-19	N= 4000 overall Outpatient study: symptomatic severity not described, symptomatic with COVID-19 in the community who are at high risk of disease progression Inpatient study: severity not described, symptomatic with COVID-19
Setting (hospital, ambulatory,..)	Hospital	Hospital	Hospital and Outpatients
Intervention (generic drug name and dosage)	<ul style="list-style-type: none"> Aspirin with standard of care: Aspirin tablet 75mg once daily for ten days or till discharge whichever is later. Atorvastatin (Statin) with standard of care: Atorvastatin 40mg tablet once daily for ten days or till discharge whichever is later Aspirin + atorvastatin with standad of care 	Aspirin administered orally with 100 mg per day on top of standard of care for COVID-19 at admission until 14 days after discharge	Outpatient study: <ul style="list-style-type: none"> Trial arm Colchicine: 0.5 or 0.6 mg twice daily for 3 days, then 0.5 or 0.6 mg once daily for 25 days (total 28 days). Trial arm ASA: 75 to 100 mg once daily for 28 days. For inpatients:

Trial Identifier/registry ID(s)/contact	CTRI/2020/07/026791[14] RESIST Deepti Siddharthan; 9968774019; deeptikailath@gmail.com	NCT04365309 PEAC Contact: Cai Yue; the first affiliated hospital of the Air force medical university	NCT04324463 ACT COVID-19 Contact: ACT COVID-19 Study Coordinator; 905-297-3479; ACT.ProjectTeam@PHRI.ca
			<ul style="list-style-type: none"> • Trial arm Interferon-β: 0.25 mg by subcutaneous injection on days 1, 3, 5 & 7 • Trial arm Colchicine: 1 or 1.2 mg followed by 0.5 or 0.6 mg 2 hours later, then 0.5 or 0.6 mg twice daily for 28 days. • Trial arm combination of ASA and rivaroxaban: ASA 75 to 100 mg once daily for 28 days; 2.5 mg twice daily for 28 days.
Comparator (standard care or generic drug name and dosage)	Standard of care: conventional therapy for COVID-19 infected patients	Standard of care without aspirin	No Intervention: Usual Care (Control) Outpatients and Inpatients: No constraints for treating physicians on the therapies within the standard of care arm. All key co-interventions will be documented.
Primary Outcome(s)	<ul style="list-style-type: none"> • Clinical deterioration characterised by progression to WHO clinical improvement ordinal score more than or equal to 6 (i.e., endotracheal intubation, non-invasive mechanical ventilation, pressor agents, RRT, ECMO, and mortality). Time frame: 10 days or until discharge whichever is longer 	<ul style="list-style-type: none"> • clinical recovery time (TTCR) defined as the study treatment (oral aspirin enteric-coated tablet) began to fever, breathing rate, blood oxygen saturation recovery, and cough relieving for at least 72 hours. [Time Frame: not more than 14 days] • the time of SARS-CoV2 overcasting defined as Time of SARS-CoV2 in upper respiratory tract specimens overcasting detected by RT-PCR. [Time Frame: not more than 37 days] 	<p>Outpatient trial Colchicine vs. control & ASA vs. control</p> <ul style="list-style-type: none"> • composite of hospitalization or death. [Time Frame: 45 days post randomization] <p>Inpatient trial Interferon-β vs. control & Colchicine vs. control & ASA and rivaroxaban vs. control</p> <ul style="list-style-type: none"> • composite of invasive mechanical ventilation or death. [Time Frame: 45 days post randomization]
Sponsor/ lead institution, country (also country of recruitment if different)	All India Institute of Medical Sciences (AIIMS), New Delhi, India	Xijing Hospital, China	Sponsor: Population Health Research Institute, Canada Collaborator: Bayer Countries of recruitment: Brazil, Canada, Chile, Colombia, Ecuador, Egypt, India, Pakistan, Philippines, Russian

Trial Identifier/registry ID(s)/contact	CTRI/2020/07/026791[14] RESIST Deepti Siddharthan; 9968774019; deeptikailath@gmail.com	NCT04365309 PEAC Contact: Cai Yue; the first affiliated hospital of the Air force medical university	NCT04324463 ACT COVID-19 Contact: ACT COVID-19 Study Coordinator; 905-297-3479; ACT.ProjectTeam@PHRI.ca
			Federation, Saudi Arabia, United Arab Emirates

*Mixed COVID-19, Mild, Moderate, Severe, Critical COVID-19; **The duration and dose of empiric antibiotics will be determined by the treating clinician and local guidelines or practice.

Abbreviations: see list of abbreviation on page 5. REMAP-COVID=sub-platform of REMAP-CAP evaluating treatments specific for COVID-19; REMAP-CAP=Randomized, Embedded, Multifactorial Adaptive Platform Trial for Community- Acquired Pneumonia

Table 4-5 Ongoing trials of single agent: Aspirin, continued

Trial Identifier/registry ID(s)/contact	NCT04703608 / PACTR202101544570971 PaTS-COVID Contact: Gibbi Sey; +220 4495442 ext 2204; gsey@mrc.gm	NCT04333407 C-19-ACS Contact: Alena Marynina; 07776 224520; alena.marynina@nhs.net	CTRI/2020/08/027503 Contact: Souvik Maitra; souvikmaitra@live.com
Study design, study phase	RCT. Multicenter single blinded trial with parallel group assignment Permuted block randomization; central allocation; masking: participant, blinding with non-identical placebo	Multicenter RCT with parallel group assignment Masking: none	RCT. Two-arm single center pilot trial with parallel group assignment Stratified block randomization Concealment: sequentially numbered, sealed, opaque envelopes Masking: outcome assessor
Recruitment status	Recruiting (last update at trial registry 27 Jan. 2021)	Recruiting (last update at trial registry 9 April 2020)	Not yet recruiting (last update at trial registry 31 Aug. 2020)
Number of Patients, Disease severity*	Unclear, 1'200 for both cohorts defined by mild/moderate versus severe COVID-19** Severe	N= 3170 Not reported	N=60; moderate to severe
Setting (hospital, ambulatory,..)	Hospital	Hospital	Hospital
Intervention (generic drug name and dosage)**	Aspirin: 150 mg daily for 28 days or until hospital discharge (whichever is <ul style="list-style-type: none"> sooner) 	<ul style="list-style-type: none"> Aspirin 75mg once daily unless contraindicated Clopidogrel 75mg, once daily unless contraindicated Rivaroxaban 2.5 mg twice daily unless contraindicated. If patient on DOAC then change to rivaroxaban 2.5mg unless contraindicated 	Aspirin: Low dose aspirin (75 mg OD) for 10 days along with standard of care

Trial Identifier/registry ID(s)/contact	NCT04703608 / PACTR202101544570971 PaTS-COVID Contact: Gibbi Sey; +220 4495442 ext 2204; gsey@mrc.gm	NCT04333407 C-19-ACS Contact: Alena Marynina; 07776 224520; alena.marynina@nhs.net	CTRI/2020/08/027503 Contact: Souvik Maitra; souvikmaitra@live.com
		<ul style="list-style-type: none"> Atorvastatin 40mg once daily unless contraindicated Omeprazole, if patient not on a proton pump inhibitor, add omeprazole 20mg once daily 	
Comparator (standard care or generic drug name and dosage)	Non identical placebo; doses as per above	<ul style="list-style-type: none"> No intervention (supportive care) 	Standard of care: standard practice of the institute at that time
Primary Outcome(s)	Percentage of COVID-19 associated severe pneumonia patients worsening their condition [Time frame at discharge or day 28 (whichever is first)]	All-cause mortality at 30 days after admission	SpO2/ FiO2 ratio in day 1- 7 post randomization
Sponsor/ lead institution, country (also country of recruitment if different)	London School of Hygiene and Tropical Medicine, Great Britain; Recruitment in Gambia	Imperial College London, UK	All India Institute of Medical Sciences, New Delhi, India

*Mixed COVID-19, Mild, Moderate, Severe, Critical COVID-19

** RCT with two cohorts, descriptions only apply to cohort 2, cohort 1 is described in EUNETHTA RCR 22 on Ivermectin[15].

Abbreviations: see list of abbreviation on page 5.

Table 4-6 Ongoing trials of single agent: Aspirin, continued

Trial Identifier/registry ID(s)/contact	IRCT20180205038626N7 zahra ahmadnia; gums.icrc@gmail.com	PACTR202006473370201 CRASH-19 Ian Roberts; crash19@lshtm.ac.uk	
Study design, study phase	RCT. Single center two-arm trial with parallel group assignment Permutation block randomisation (block size 6); Concealment: sealed envelopes; Masking: outcome assessor	RCT. Multinational open label trial with factorial group assignment Permuted block randomisation Concealment: central randomisation by phone/fax	
Recruitment status	Recruiting (last update at trial registry 27 Dec. 2020)	Not yet recruiting (last update at trial registry 17 June 2020)	
Number of Patients, Disease severity*	N=36; non-critical	N=10'000, non-critical	
Setting (hospital, ambulatory,..)	Hospital	Hospital	
Intervention (generic drug name and dosage)**	Aspirin 80 mg for three months.	<ul style="list-style-type: none"> Aspirin: 150mg once daily, up to 28 days (n=1250) 	

Trial Identifier/registry ID(s)/contact	IRCT20180205038626N7 zahra ahmadnia; gums.icrc@gmail.com	PACTR202006473370201 CRASH-19 Ian Roberts; crash19@lshtm.ac.uk	
		<ul style="list-style-type: none"> • Losartan: 100mg once daily, up to 28 days (n=1250) • Simvastatin: 80mg once daily, up to 28 days (n=1250) • Aspirin & Losartan, up to 28 days (n=1250) • Aspirin and Simvastatin, up to 28 days (n=1250) • Losartan and Simvastatin, up to 28 days (n=1250) • Aspirin & Losartan & Simvastatin, up to 28 days (n=1250) 	
Comparator (standard care or generic drug name and dosage)	Standard treatment for three months, not further described	<ul style="list-style-type: none"> • Usual standard of care at the study hospital, up to 28 days (n=1250) 	
Primary Outcome(s)	Thromboembolic events at the beginning of the study and 3 and 6 months later	In-hospital death up to 28 days	
Sponsor/ lead institution, country (also country of recruitment if different)	Rasht University of Medical Sciences, Rasht, Iran	London School of Hygiene and Tropical Medicine, UK Recruitment in Nigeria and Pakistan	

*Mixed COVID-19, Mild, Moderate, Severe, Critical COVID-19

Abbreviations: see list of abbreviation on page 5.

Table 4-7 Ongoing trials of combination therapies including Aspirin

Trial Identifier/registry ID(s)/contact	NCT04410328 ATTAC-19 Amit Singla; 3195123558; as3321@njms.rutgers.edu	CTRI/2020/09/028088 CAM-Covid-19 Vivek Chauhan; drvivekshimla@yahoo.com	
Study design, study phase	RCT. Single center open label two arm pilot trial with parallel group assignment	RCT. Single center open label two arm pilot trial with parallel group assignment Computer generated randomization Concealment: central randomisation	
Recruitment status	Recruiting (last update at trial registry 23 Oct. 2020)	Not yet recruiting (last update at trial registry 25 Sept. 2020)	
Number of Patients, Disease severity*	N=132 Not reported	N=34 Severe	
Setting (hospital, ambulatory,..)	Hospital	Hospital	

Trial Identifier/registry ID(s)/contact	NCT04410328 ATTAC-19 Amit Singla; 3195123558; as3321@njms.rutgers.edu	CTRI/2020/09/028088 CAM-Covid-19 Vivek Chauhan; drvivekshimla@yahoo.com	
Intervention (generic drug name and dosage)	Dipyridamole and Aspirin (Aggrenox): <ul style="list-style-type: none"> Dipyridamole ER 200mg/ Aspirin 25mg orally/enterally 2 times daily plus standard care starting on the day of enrollment for a total of 2 weeks. 	Colchicine, Aspirin and Montelukast: <ul style="list-style-type: none"> Colchicine - 0.6 mg per oral, 12 hourly till discharge Aspirin - 325 mg per oral 6 hourly till discharge Montelukast - 10 mg per oral once a day till discharge 	
Comparator (standard care or generic drug name and dosage)	Standard of care: standard care starting on the day of enrolment for a total of 2 weeks.	Standard of care	
Primary Outcome(s)	Covid Ordinal Scale: Change in composite COVID ordinal scale at day 15. Ordinal scale Ranging from 1) not hospitalized with resumption of normal activities to 8) death. [Time Frame: 15 days]	Change in the marker of Adult Multi-system Inflammatory Syndrome i.e. C-reactive Protein up to 4 months	
Sponsor/ lead institution, country (also country of recruitment if different)	Rutgers, The State University of New Jersey, USA	Indira Gandhi Medical College, Shimla, India	

*Mixed COVID-19, Mild, Moderate, Severe, Critical COVID-19;

Abbreviations: see list of abbreviation on page 5

Table 4-8 Ongoing observational studies evaluating effect of aspirin

Trial Identifier/registry ID(s)/contact	NCT04466670		
Study design, study phase	Phase 3 Non-randomised controlled study with adaptive design and parallel group assignment Masking: none		
Recruitment status	Recruiting (last update at trial registry at 10 July 2020)		
Number of Patients, Disease severity*	N=310 Not described		
Setting (hospital, ambulatory,..)	Hospital		
Intervention (generic drug name and dosage)	<ul style="list-style-type: none"> Trial arm Unfractionated heparin 		

Trial Identifier/registry ID(s)/contact	NCT04466670		
	<ul style="list-style-type: none"> • Trial arm acetylsalicylic acid: Aspirin (ASA) 100 mg daily PO during at least 5 days • Trial arm Enoxaparin In all intervention arms: AND arterial oxygen saturation greater than or equal to 92% or PaO2 to FiO2 ratio greater than 200 for 2 consecutive days associated to thromboprophylaxis institutional protocol		
Comparator (standard care or generic drug name and dosage)	Standard of care		
Primary Outcome(s)	Hospital discharge - alive / death: number of COVID-19 positive patients who are alive within 30 days of symptoms onset		
Sponsor/ lead institution, country (also country of recruitment if different)	University of Sao Paulo General Hospital, Brazil		

*Mixed COVID-19, Mild, Moderate, Severe, Critical COVID-19

Abbreviations: see list of abbreviation on page 5.

5 REFERENCES

1. Higgins JPT TJ, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). Cochrane Handbook for Systematic Reviews of Interventions version 6.0 (updated July 2019): Cochrane; 2019. Available from: <http://www.training.cochrane.org/handbook>.
2. DerSimonian R LN. Meta-analysis in clinical trials. *Controlled Clinical Trials* 1986;7:177-88.
3. Balslem H HM, Schünemann HJ, Oxman AD, Kunz R, Brozek J, Vist GE, Falck-Ytter Y, Meerpohl J, Norris S, Guyatt GH. GRADE guidelines: 3. Rating the quality of evidence. *Journal of Clinical Epidemiology* 2011;64:401-6.
4. Munn Z, Moola S, Lisy K, Riitano D, Tufanaru C. Methodological guidance for systematic reviews of observational epidemiological studies reporting prevalence and incidence data. *Int J Evid Based Healthc.* 2015;13(3):147–53.
5. The use of non-steroidal anti-inflammatory drugs (NSAIDs) in patients with COVID-19. Scientific Brief: World Health Organization; 19 April 2020 [Accessed: 15 Feb 2021]. Available from: [https://www.who.int/news-room/commentaries/detail/the-use-of-non-steroidal-anti-inflammatory-drugs-\(nsaids\)-in-patients-with-covid-19](https://www.who.int/news-room/commentaries/detail/the-use-of-non-steroidal-anti-inflammatory-drugs-(nsaids)-in-patients-with-covid-19).
6. Koo YM, Heo AY, Choi HW. Salicylic Acid as a Safe Plant Protector and Growth Regulator. *Plant Pathol J.* 2020;36(1):1-10.
7. Peppelenbosch M. Aspirin and COVID-19: Aspirin Foundation; 2020 [Accessed: 12 Feb. 2021]. Available from: <https://www.aspirin-foundation.com/forum/aspirin-and-covid-19/>.
8. Aspirin®. Bayer (Schweiz) AG: Swiss Medic; Dec. 2015 [Accessed: 15 Feb. 2021]. Available from: swissmedicinfo.ch.
9. Aspirin® Cardio 100, Aspirin® Cardio 300. Bayer (Schweiz) AG: Swiss Medic; Feb. 2020 [Accessed: 15 Feb. 2021]. Available from: <https://www.swissmedicinfo.ch/default.aspx?Lang=EN#section13>.
10. Carvallo H, Hirsch R, Farinella ME. Safety and efficacy of the combined use of Ivermectin, Dexamethasone, Enoxaparin and Aspirin against COVID 19. 2020 Accessed: 15.02.2021. Available from: <https://www.medrxiv.org/content/10.1101/2020.09.10.20191619v1.full.pdf>.
11. Treatments and vaccines for COVID-19: authorised medicines: European Medicines Agency; [Accessed: 15 Feb. 2021]. Available from: <https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19/treatments-vaccines/treatments-vaccines-covid-19-authorized-medicines>.
12. Florêncio FKZ, Tenório MO, Macedo Júnior ARA, Lima SG. Aspirin with or without statin in the treatment of endotheliitis, thrombosis, and ischemia in coronavirus disease. *Revista da Sociedade Brasileira de Medicina Tropical.* 2020;53:e20200472.
13. EUnetHTA Rolling Collaborative Review (RCR20) Authoring Team. High-Dose Vitamin D for the treatment of COVID-19 Diemen (The Netherlands): EUnetHTA;2021 [15.02.2021]. 34 pages. Report No.: RCR20, v1.0.: [Available from: <https://www.eunetha.eu>].
14. Ghati N, Roy A, Bhatnagar S, Bhati S, Bhushan S, Mahendran M, et al. Atorvastatin and Aspirin as Adjuvant Therapy in Patients with SARS-CoV-2 Infection: A structured summary of a study protocol for a randomised controlled trial. *Trials.* 2020;21(1):902.

15. EUnetHTA Rolling Collaborative Review (RCR22) Authoring Team. Ivermectine for the treatment of COVID-19 Diemen (The Netherlands): EUnetHTA;2021 [Accessed: 15 Feb. 2021]. 34 pages. Report No.: RCR22, v1.0.: [Available from: [https //www.eunethta.eu](https://www.eunethta.eu).
16. ChiCTR2000030556. Clinical study of nano-nose and its extended technology in diagnosis of novel coronavirus pneumonia (COVID-19) Chinese Clinical Trial Registry [Accessed: 12 Feb. 2021]. Available from: <http://www.chictr.org.cn/showproj.aspx?proj=50672>.
17. ChiCTR2000032632. The influence of COVID-19 pandemic on cardiovascular patients Chinese Clinical Trial Registry [Accessed: 12 Feb. 2021]. Available from: <http://www.chictr.org.cn/showproj.aspx?proj=53190>.

6 APPENDIX

6.1 Search strategy to identify randomised controlled trials

DEPLazio, the Department of Epidemiology of the Regional Health Service Lazio in Rome, Italy is responsible for setting up the search strategy to identify randomised controlled trials (RCTs). DEPLazio performed a search in Medline, PubMed, and Embase, which has been updated weekly from March 2020 (Appendix Table 6-1). DEPLazio searched medRxiv.org (<https://www.medrxiv.org/>), bioRxiv.org (<https://www.biorxiv.org/>), and arXiv.org (<https://www.arxiv.org/>) for preprints of preliminary reports of randomised trials. The Cochrane Covid-19 Study Register (<https://covid-19.cochrane.org/>), ClinicalTrials.gov (www.clinicaltrials.gov) and World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP) (www.who.int/ictcp/en/) were search in addition. Other sources included journal alerts, contact with researchers, websites such as Imperial College, London School of Hygiene and Tropical Medicine, and Eurosurveillance. We applied no restriction on language of publication.

We included randomised controlled trials (RCTs) comparing any pharmacological intervention against another pharmacological intervention or placebo or standard care (SC), for the treatment of individuals with Covid-19. We excluded studies comparing two dosages of the same pharmacological agent. We did not exclude studies on individuals with a comorbid disorder.

Four authors independently screened the references retrieved by the search, selected the studies, and extracted the data, using a predefined data-extraction sheet. The same reviewers discussed any uncertainty regarding study eligibility and data extraction until consensus was reached; conflicts of opinion were resolved with other members of the review team. Two authors independently assessed the risk of bias of the included studies with the Cochrane tool. Three authors used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach, to evaluate the strength of evidence.

The methods described above are part of a living review of pharmacological agents for the treatment of Covid-19 conducted by the Department of Epidemiology of the Regional Health Service Lazio, Italy, to inform national regulatory agencies and clinicians, available at <https://www.deplazio.net/farmacicovid>. The review is registered on Prospero (CRD42020176914).

Table 6-1 Search strategy to identify randomised controlled studies

Database	URL	Search line / Search terms	Date of search
Pubmed	pubmed.ncbi.nlm.nih.gov	<p>1. ((((((("Coronavirus"[Mesh]) OR (coronavirus*[Title/Abstract] OR coronavirus*[Title/Abstract] OR coronavirus*[Title/Abstract] OR Coronavirinae*[Title/Abstract] OR Coronavirus*[Title/Abstract] OR Wuhan*[Title/Abstract] OR Hubei*[Title/Abstract] OR Huanan[Title/Abstract] OR "2019-nCoV"[Title/Abstract] OR 2019nCoV[Title/Abstract] OR nCoV2019[Title/Abstract] OR "nCoV-2019"[Title/Abstract] OR "COVID-19"[Title/Abstract] OR COVID19[Title/Abstract] OR "CORVID-19"[Title/Abstract] OR CORVID19[Title/Abstract] OR "WN-CoV"[Title/Abstract] OR WNCov[Title/Abstract] OR "HCoV-19"[Title/Abstract] OR HCoV19[Title/Abstract] OR CoV[Title/Abstract] OR "2019 novel"[Title/Abstract] OR Ncov[Title/Abstract] OR "n-cov"[Title/Abstract] OR "SARS-CoV-2"[Title/Abstract] OR "SARSCoV-2"[Title/Abstract] OR "SARSCoV2"[Title/Abstract] OR "SARS-CoV2"[Title/Abstract] OR SARSCov19[Title/Abstract] OR "SARS-Cov19"[Title/Abstract] OR "SARSCov-19"[Title/Abstract] OR Ncovor[Title/Abstract] OR Ncorona*[Title/Abstract] OR Ncorono*[Title/Abstract] OR NcovWuhan*[Title/Abstract] OR NcovHubei*[Title/Abstract] OR NcovChina*[Title/Abstract] OR NcovChinese*[Title/Abstract])))) OR (((respiratory*[Title/Abstract] AND (symptom*[Title/Abstract] OR disease*[Title/Abstract] OR illness*[Title/Abstract] OR condition*[Title/Abstract] OR "seafood market"[Title/Abstract] OR "food market"[Title/Abstract] AND (Wuhan*[Title/Abstract] OR Hubei*[Title/Abstract] OR China*[Title/Abstract] OR Chinese*[Title/Abstract] OR Huanan*[Title/Abstract])) OR ("severe acute respiratory syndrome")) OR ((corona*[Title/Abstract] OR corono*[Title/Abstract] AND (virus*[Title/Abstract] OR viral*[Title/Abstract] OR virinae*[Title/Abstract])) AND ((((((randomized controlled trial [pt]) OR (controlled clinical trial [pt]) OR (randomized [tiab]) OR (placebo [tiab]) OR (clinical trials as topic [mesh: noexp]) OR (randomly [tiab]) OR (trial [ti])))) NOT (animals [mh] NOT humans [mh]) AND (2019/10/01:2020[dp]))</p>	05/02/2021

Database	URL	Search line / Search terms	Date of search
Ovid MEDLINE(R) ALL)	ovidsp.dc2.ovid.com	<ol style="list-style-type: none"> 1. exp coronavirus/ 2. ((corona* or corono*) adj1 (virus* or viral* or virinae*)),ti,ab,kw. 3. (coronavirus* or coronovirus* or coronavirinae* or Coronavirus* or Coronovirus* or Wuhan* or Hubei* or Huanan or "2019-nCoV" or 2019nCoV or nCoV2019 or "nCoV-2019" or "COVID-19" or COVID19 or "CORVID-19" or CORVID19 or "WN-CoV" or WNCov or "HCoV-19" or HCoV19 or CoV or "2019 novel*" or Ncov or "n-cov" or "SARS-CoV-2" or "SARSCoV-2" or "SARSCoV2" or "SARS-CoV2" or SARSCov19 or "SARS-Cov19" or "SARSCov-19" or "SARS-Cov-19" or Ncovor or Ncorona* or Ncorono* or NcovWuhan* or NcovHubei* or NcovChina* or NcovChinese*).ti,ab,kw. 4. (((respiratory* adj2 (symptom* or disease* or illness* or condition*)) or "seafood market*" or "food market*") adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)),ti,ab,kw. 5. ((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (China* or Chinese* or Huanan*)),ti,ab,kw. 6. "severe acute respiratory syndrome".ti,ab,kw. 7. or/1-6 8. randomized controlled trial.pt. 9. controlled clinical trial.pt. 10. random*.ab. 11. placebo.ab. 12. clinical trials as topic.sh. 13. random allocation.sh. 14. trial.ti. 15. or/8-14 16. exp animals/ not humans.sh. 17. 15 not 16 18. 7 and 17 19. limit 18 to yr="2019 -Current" 	05/02/2021
OVID EMBASE	ovidsp.dc2.ovid.com	<ol style="list-style-type: none"> 1. exp Coronavirinae/ or exp Coronavirus/ exp Coronavirus infection/ 3. (((("Corona virinae" or "corona virus" or Coronavirinae or coronavirus or COVID or nCoV) adj4 ("19" or "2019" or novel or new)) or (("Corona virinae" or "corona virus" or Coronavirinae or coronavirus or COVID or nCoV) and (wuhan or china or chinese)) or "Corona virinae19" or "Corona virinae2019" or "corona virus19" or "corona virus2019" or Coronavirinae19 or Coronavirinae2019 or coronavirus19 or coronavirus2019 or COVID19 or COVID2019 or nCOV19 or nCOV2019 or "SARS Corona virus 2" or "SARS Coronavirus 2" or "SARS-COV-2" or "Severe Acute Respiratory Syndrome Corona virus 2" or "Severe Acute Respiratory Syndrome Coronavirus 2").ti,ab,kw. 4. or/1-3 5. Clinical-Trial/ or Randomized-Controlled-Trial/ or Randomization/ or Single-Blind-Procedure/ or Double-Blind-Procedure/ or Crossover-Procedure/ or Prospective-Study/ or Placebo/ 6. (((clinical or control or controlled) adj (study or trial)) or ((single or double or triple) adj (blind\$3 or mask\$3)) or (random\$ adj (assign\$ or allocat\$ or group or grouped or patients or study or trial or distribut\$)) or (crossover adj (design or study or trial)) or placebo or placebos).ti,ab. 7. 5 or 6 8. 4 and 7 9. limit 8 to yr="2019 -Current" 	05/02/2021

6.2 Search strategy to identify observational studies

As of October 2020, NIPHNO is responsible for setting up the search strategy to identify observational studies.

From September to December 2020, we received records that EPPI Centre has screened after searching weekly in Medline and Embase (until beginning of November 2020), from November onwards Microsoft Academics Graph (MAG). We supplemented these studies with a weekly search in Scopus (Elsevier). Detailed descriptions of the EPPI and NIPHNO searches are given at their websites [16, 17]. The retrieved hits were imported to a reference management tool, Endnote (Clarivate Analytics), for deduplication. We then searched the EndNote database using the generic names and synonyms for the included COVID-19 drugs.

From January onwards, an information specialist at NIPHNO has conducted searches in Medline (Ovid), Embase (Ovid) and Scopus (Elsevier) using the search strategy described in table 6.2. To screen the references, two reviewers use a binary machine learning (ML) classifier. References that scored above the identified threshold of 30% certainty to be relevant were retained for screening; while those scoring below this threshold score were set aside.

Prior to using the binary ML classifier score to discard low scoring records, we screened 1028 references manually to train the classifier. The classifier is continuously being updated a long with new references being screened. References that have been set aside, can potentially be picked up in a later stage by a new classifier version. For drugs that have less than 5 publications included in the training batch, we combine the classifier with manual text word searches.

Table 6-2 provides details of the search strategy.

Table 6-2 Search strategy to identify observational studies

Database	URL	Search terms / Search modality	Date of search
Embase 1974 to 2021		Lines 1 and 2 are copies of Ovid's Expert searches for covid-19 in MEDLINE and Embase	From 1/9/2020 until 3/2/2021
Ovid MEDLINE(R) ALL 1946 to 2021		<p>1 (((pneumonia or covid* or coronavirus* or corona virus* or ncov* or 2019-ncov or sars*).mp. or exp pneumonia/) and Wuhan.mp.) or (2019-ncov or ncov19 or ncov-19 or 2019-novel CoV or sars-cov2 or sars-cov-2 or sarscov2 or sarscov-2 or Sars-coronavirus2 or Sars-coronavirus-2 or SARS-like coronavirus* or coronavirus-19 or covid19 or covid-19 or covid 2019 or ((novel or new or nouveau) adj2 (CoV or nCoV or covid or coronavirus* or corona virus or pandemi*2)) or ((covid or covid19 or covid-19) and pandemi*2) or (coronavirus* and pneumonia)).mp. or COVID-19.rx,px,ox,sh. or severe acute respiratory syndrome coronavirus 2.os.) use medall [COVID-19 in MEDLINE]</p> <p>2 (((pneumonia or covid* or coronavirus* or corona virus* or ncov* or 2019-ncov or sars*).mp. or exp pneumonia/) and Wuhan.mp.) or (coronavirus disease 2019 or 2019-ncov or ncov19 or ncov-19 or 2019-novel CoV or severe acute respiratory syndrome coronavirus 2 or sars-cov2 or sars-cov-2 or sarscov2 or sarscov-2 or Sars-coronavirus2 or Sars-coronavirus-2 or SARS-like coronavirus* or coronavirus-19 or covid19 or covid-19 or covid 2019 or ((novel or new or nouveau) adj2 (CoV or nCoV or covid or coronavirus* or corona virus or</p>	Covering publication dates 01. September 2020

		<p>pandemi*2)) or ((covid or covid19 or covid-19) and pandemic*2) or (coronavirus* and pneumonia)).mp. or (coronavirus disease 2019 or severe acute respiratory syndrome coronavirus 2).sh,dj.) use oemez [COVID-19 in Embase]</p> <p>3 (COVID-19 serotherapy/ or Immunization, Passive/ or tocilizumab/ or camostat/ or nafamostat/ or AP301 peptide/ or Interleukin 1 Receptor Antagonist Protein/ or alunacedase alfa/ or darunavir/ or favipiravir/ or sarilumab/ or exp Interferons/ or gimsilumab/ or canakinumab/ or REGN-COV-2/ or bamlanivimab/ or baricitinib/ or molnupiravir/ or Aspirin/ or mavrilimumab/ or exp Vitamin D/dt or Vitamin D Deficiency/dt or Ivermectin/) use medall [MeSH-terms for drugs in MEDLINE]</p> <p>4 (Hyperimmune globulin/dt or tocilizumab/ or camostat/ or camostat mesilate/ or nafamstat/ or solnatide/ or anakinra/ or darunavir/ or favipiravir/ or sarilumab/ or exp Interferon/ or gimsilumab/ or canakinumab/ or baricitinib/ or acetylsalicylic acid/ or mavrilimumab/ or exp Vitamin D/dt or Vitamin D Deficiency/dt or ivermectin/) use oemez [Emtree-terms for drugs in Embase]</p> <p>5 ((convalescent adj (plasma or sera or serum)) or serotherap* or ((atoxin or hyperimmunoglobulin or hyperimmune globulin or hyperimmune gammaglobulin) adj therap*) or passive immuni?ation or (tocilizumab or atlizumab or (MRA adj monoclonal antibod*) or MSB-11456 or MSB11456 or R-1569 or R1569 or RO-4788533 or RO4788533 or Actemra or Roactemra) or (camostat* or FOY-305 or FOY305 or FOY S 980) or (nafamostat or nafamstat or FUT-175 or FUT175) or (solnatide or AP301 or AP-301 or (TIP adj peptide)) or (anakinra or ((interleukin 1 or IL1 or IL-1) adj2 (antagonist or block* or inhibitor*)) or IL-1Ra or Kineret) or (alunacedase or APN01 or APN-01 or rhACE2 or recombinant human angiotensin converting enzyme 2 or GSK-2586881 or GSK2586881) or (darunavir or prezista or TMC-114 or TMC114 or UIC-94017 or UIC94017) or (favipi?avir or T-705 or T705 or Avigan or Olumiant) or (sarilumab or REGN-88 or REGN88 or SAR-153191 or SAR153191 or Kevzara) or (interferon* or (IFN adj1 (alpha* or beta* or gamma*)) or novaferon or CL-884 or CL884) or (gimsilumab or KIN-1901 or KIN1901 or morab-022 or morab022) or (canakinumab or ACZ-885 or ACZ885 or immunoglobulin G1 or Ilaris) or (REGN-CoV-2 or REGN-CoV2 or antibody cocktail or ((casirivimab or REGN-10933 or REGN10933) and (imdevimab or REGN-10987 or REGN10987))) or (bamlanivimab or LY-CoV555 or LYCoV555 or LY-3819253 or LY3819253) or (baricitinib or LY-3009104 or LY3009104 or INCB-028050 or INCB028050 or INCB-28050 or INCB28050 or Olumiant) or (molnupiravir or MK-4482 or MK4482 or EIDD-2801 or EIDD2801) or (aspirin or acetylsalicylic acid) or (mavrilimumab or immunoglobulin G4 or CAM-3001 or CAM3001) or ((vitamin? D? or D?-vitamin?) adj4 (high-dose* or highdose* or supplement*)) or (ivermect* or MK-933 OR MK933)).mp,bt,ot,du,dy,tn,nm. [other</p>	
--	--	--	--

		<p>terms (title, abstract, author keywords and more) in MEDLINE and Embase]</p> <p>6 (202009* or 202010* or 202011 or 202012* or 202101* or 202102*).dt. use medall [time limits in MEDLINE]</p> <p>7 (202009* or 202010* or 202011 or 202012* or 202101* or 202102*).dc. use oomezd [time limits in Embase]</p> <p>8 (1 and (3 or 5) and 6) use medall</p> <p>9 (2 and (4 or 5) and 7) use oomezd</p>	
--	--	--	--

6.3 Search strategy to identify ongoing studies

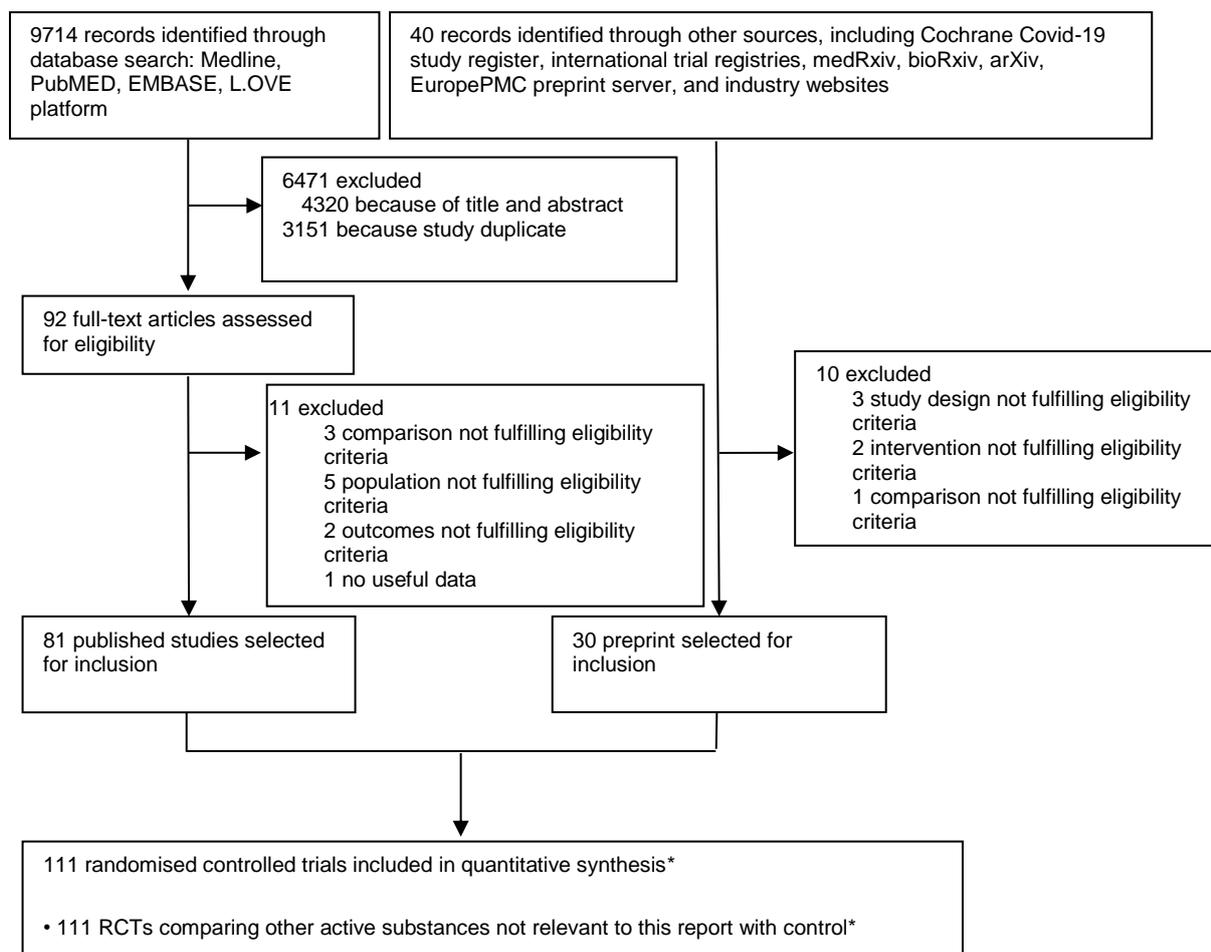
SNHTA is responsible for searching in trial registries to identify ongoing and unpublished studies. The combination of search terms related to COVID-19 and Aspirin are described in Appendix Table 6-3.

Table 6-3 Search strategy to identify ongoing studies

Database	URL	Search line / search terms	Date of search	Hits retrieved
ClinicalTrials.gov	https://clinicaltrials.gov/	<p>"Basic search mode*" [adapt if you used "Advanced search mode"]</p> <p>Terms used at Condition or disease:</p> <ul style="list-style-type: none"> covid-19 <p>Terms used at "other terms":</p> <ul style="list-style-type: none"> aspirin <p>clinicaltrials.gov automatically searches relevant synonyms of aspirin and COVID-19</p>	12/02/2021	18 18 new
ISRCTN	https://www.isrctn.com/	<p>Basic search mode [adapt if you used "Advanced search mode"]</p> <p>Search terms:</p> <ol style="list-style-type: none"> covid-19 and aspirin covid-19 and Acetylsalicylic Acid covid-19 and ASA SARS-CoV-2 and aspirin SARS-CoV-2 and Acetylsalicylic Acid SARS-CoV-2 and ASA 	12/02/2021	4 4 new
European Clinical Trials Registry	https://www.clinicaltrialsregister.eu/	<p>Basic search mode [adapt if you used "Advanced search mode"]</p> <p>Search terms:</p> <ol style="list-style-type: none"> covid-19 and aspirin covid-19 and Acetylsalicylic Acid covid-19 and ASA SARS-CoV-2 and aspirin SARS-CoV-2 and Acetylsalicylic Acid SARS-CoV-2 and ASA 	12/02/2021	4 4 new
ICTRP COVID-19 collection accessed through search platform of clinicaltrials.gov	https://clinicaltrials.gov/ct2/who_table	<p>Basic search mode</p> <p>Terms used: aspirin acetylsalicylic acid</p>	12/02/2021	19 19 new
COVID-NMA	https://covid-nma.com/dataviz/	<p>Basic search mode</p> <p>Terms used: aspirin</p>	12/02/2021	10 10 new
Google Scholar / Google/ PubMed	Google.com Scholar.google.com Pubmed.org	<p>Basic search mode</p> <p>Terms used: trial acronyms and clinical trial registration numbers of included ongoing studies (both randomized and non-randomized studies)</p>	12/02/2021	3 3 new

* In Basic Search mode, one term was added to the field "condition or disease" and one term in the field "other terms".

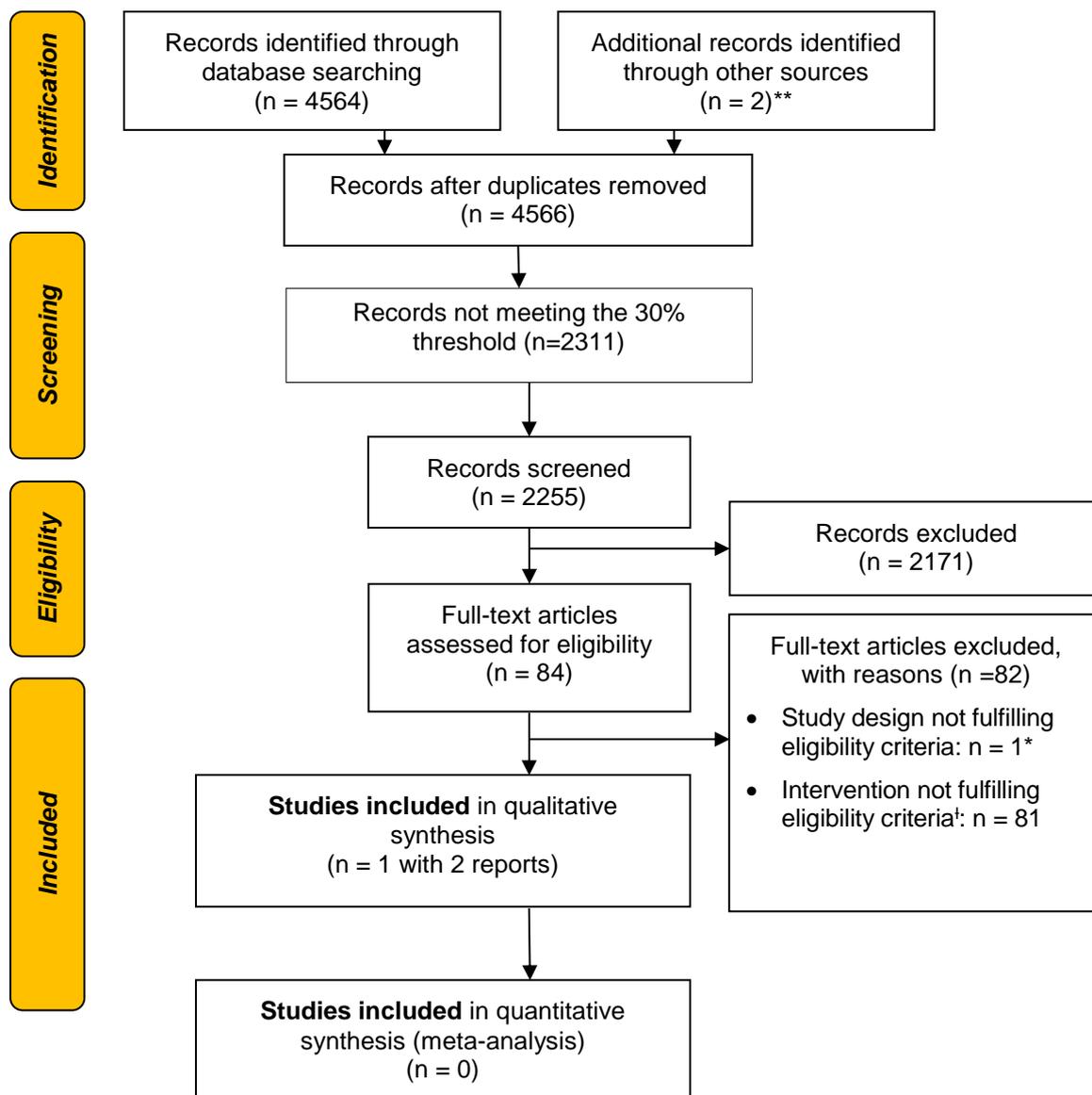
6.4 Flow diagrams



Appendix Figure 6-1. Flow diagram depicting the selection process of RCTs

RCT = randomised controlled trial;

* The selection process was part of an external project, see <https://www.deplazio.net/farmacicovid> and Prospero ID CRD42020176914.



Appendix Figure 6-2. Flow diagram depicting the selection process of observational studies

* < 50 patients included [12]

** identified by SNHTA through searches described in Table 6-3.

† studies evaluating active substances relevant to other EUnetHTA rolling collaborative reviews