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Rapid community testing for COVID-19

Submission date
13/07/2020

Recruitment status
No longer recruiting

Registration date
20/07/2020

Overall study status
Completed

Last Edited
06/02/2025

Condition category
Infections and Infestations

[X] Prospectively registered

[X] Protocol

[_] Statistical analysis plan

[X] Results

[_] Individual participant data

Plain English summary of protocol

Background and study aims

COVID-19 is a condition caused by the coronavirus (called SARS-CoV-2) that was first identified in late 2019. This virus can infect the respiratory (breathing) system. Some people do not have symptoms but can carry the virus and pass it on to others. People who have developed the condition may develop a fever and/or a continuous cough among other symptoms. This can develop into pneumonia. Pneumonia is a chest infection where the small air pockets of the lungs, called alveoli, fill with liquid and make it more difficult to breathe.

In 2020, the virus has spread to many countries around the world and neither a vaccine against the virus or specific treatment for COVID-19 has yet been developed. As of April 2020, it is advised that people minimize travel and social contact, and regularly wash their hands to reduce the spread of the virus.

Groups who are at a higher risk from infection with the virus, and therefore of developing COVID-19, include people aged over 70 years, people who have long-term health conditions (such as asthma or diabetes), people who have a weakened immune system and people who are pregnant. People in these groups, and people who might come into contact with them, can reduce this risk by following the up-to-date advice to reduce the spread of the virus.

There are currently no rapid diagnostic tests that have been evaluated as fit-for-purpose in NHS primary care that aim to identify whether adults are currently, or have been, infected by COVID-19. Accurate diagnosis of infection, identification of immunity and monitoring the clinical progression of infection are of paramount importance to our response, and for all of these diagnostics are central. Widespread population testing has proven difficult in western countries and has been limited by test availability, diagnostic test sensitivity, human resources and long turnaround times (up to 72 hours). This has limited our ability to control the spread of infection and to develop effective clinical pathways to enable early social isolation of infected patients, early treatment for those most at risk and early return to work for those with resolved infection and potential immunity. Point-of-care tests (POCTs) can be used in the community where there is no easy access to a specialist laboratory, in locations such as NHS general practices. POCTs provide quick results that allow people to get immediate advice about self-isolation and treatment, potentially blocking further spread of infection in the community. In-context evaluation of POCTs in the community is important as test accuracy can vary based on the prevalence of disease in the population tested. The severity of the COVID-19 disease in the community is much lower than in hospital patients. Symptomatic acutely unwell hospitalised patient are likely to have higher viral loads that are easier to detect, and may be undergoing invasive procedures to collect samples from the lower respiratory tract, that have a higher yield.

Testing only severe patients introduces spectrum bias, and biases the results to overestimate test performance. It is important to diagnose hospital patients, but from a public health point of view the most concerning patients are ambulatory outpatients, who may spread the virus much further in the community if falsely reassured. Evaluations of COVID-19 POCTs are therefore required in each clinical setting. Community-based POCTs may lead to additional public health impacts such as reducing onward household transmission of COVID-19, improving surveillance of NHS and social care staff, accurate prevalence estimates, and understanding of COVID-19 transmission dynamics in the population. This study will provide the community testbed to the COVID-19 National Diagnostic Research and Evaluation Platform (CONDOR). Its platform design will allow for both flexibility in which POCTs are evaluated and for changes in PHE choice of reference standard.

Who can participate?
1. Adults (aged 16 years and over) with suspected current or past COVID-19 infection having an oropharyngeal/nasopharyngeal (OP/NP) swab for laboratory COVID-19 testing as part of clinical care/testing
2. Children (aged under 16 years) with suspected current COVID-19 infection having OP/NP swab for laboratory COVID-19 testing as part of clinical care/testing

What does the study involve?
Adult patients will be asked to consent to:
1. Answer a short questionnaire about eligibility and their clinical details
2. Use at least one, but the intention is to assess multiple, POCTs for COVID-19
3. Agree to the results of their clinical test being shared with researchers
4. The study team accessing their NHS electronic health records for 1 year
5. Further contact from the study team to track symptoms and health status (daily after the first study visit until the second visit)
6. A second visit for additional blood sampling
The parent or legal guardian of the children will be asked to provide parental consent on behalf of their child to:
1. Answer a short questionnaire about eligibility and their clinical details
2. Use at least one, but the intention is to assess multiple, POCTs for COVID-19
3. Agree to the results of their clinical test being shared with researchers
4. The study team accessing their child's NHS electronic health records for 1 year
5. Further contact from the study team to track symptoms and health status (daily after the first study visit for 28 days)

What are the possible benefits and risks of participating?
There is no direct benefit to participants associated with any results of the POCTs being evaluated. The accuracy of the POCTs being tested is unknown (which is why this research is required), so the results cannot be used to guide clinical care. It is possible that patients may benefit indirectly, either because they may require testing in the future, by which time the tests being evaluated may be available or because the tests could be used to enhance the public health response to COVID-19 and may accelerate control of the pandemic. Nose and throat swabs cause some transient discomfort to patients, but there are no clinically significant risks associated with the procedure. Provision of saliva samples is unlikely to cause discomfort to any participants. To mitigate these risks, self-sampling will be supported where appropriate, otherwise these procedures will be carried out by personnel who have received training in these procedures or who carry out these procedures as a routine element of their duties.

Where is the study run from?
University of Oxford (UK)

When is the study starting and how long is it expected to run for?
April 2020 to May 2024

Who is funding the study?
1. UK Research and Innovation (UK)
2. Medical Research Council (UK)
3. Lumira DX UK Ltd (UK)
4. Roche Diagnostics International AG

Who is the main contact?
Unfortunately, this study is not recruiting public volunteers at this time. This is because the research isn't ready for volunteers yet or the researchers are directly identifying volunteers in certain areas or hospitals. Please do not contact the research team as they will not be able to respond. For more information about COVID-19 research, visit the Be Part of Research homepage.

Study website
https://www.condor-platform.org/condor_workstreams/raptor

Contact information

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Public

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Additional identifiers

EudraCT/CTIS number
Nil known

IRAS number
284320

ClinicalTrials.gov number
Nil known

Secondary identifying numbers
CPMS 46023, IRAS 284320

Study information

Scientific Title
Expanding national RAPid community Test evaluation capacity fOR COVID-19 (RAPTOR-C19)

Acronym
RAPTOR-C19

Study objectives
The NHS urgently needs quick, accurate rapid diagnostic tests to diagnose people with coronavirus or to confirm that people do not have the infection. Point-of-care Tests (POCTs) can be used in community settings where there is no easy access to a specialist laboratory. They

provide quick results that allow people to get immediate advice about self-isolation and treatment, potentially blocking further spread of infection in the community. Companies are quickly developing new rapid diagnostic tests, but we do not know how well they work. Some tests give a result like a pregnancy test by using a drop of blood from a finger prick. Others use saliva, or a swab to collect a sample from the nose or throat.

Companies check tests work in their laboratories, but usually tests do not work as well when used in the field with real patients. Accurate rapid diagnostic tests are important so that people are not falsely reassured when they are infected, and are not wrongly diagnosed when they are not really infected.

The researchers manage a national surveillance system with a network of community settings including GP practices from all over England that report directly to the Department of Health and Social Care about a wide range of infections. These GP practices have been testing for coronavirus since January 2020 with samples sent for laboratory tests. In this study, practices in the network will quickly compare new POCTs for coronavirus with laboratory tests to see how good the new tests are in a coordinated and efficient way. National COVID-19 Test centres may also support the research project.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 10/06/2020, North West - Liverpool Central Research Ethics Committee (3rd Floor, Barlow House, 4 Minshull Street, Manchester, M1 3DZ, UK; +44 (0)207 104 8197; liverpoolcentral.rec@hra.nhs.uk), REC ref: 20/NW/0282

Study design
Observational; Design type: Validation of investigation /therapeutic procedures

Primary study design
Observational

Secondary study design
Diagnostic accuracy study

Study setting(s)
GP practice

Study type(s)
Diagnostic

Participant information sheet
See study outputs table

Health condition(s) or problem(s) studied
COVID-19 (SARS-CoV-2 infection)

Interventions
Current intervention as of 16/03/2022:
RAPid Community Testing fOR COVID-19 (RAPTOR-C19) incorporates a series of prospective

observational diagnostic accuracy studies of COVID-19 point-of-care diagnostic tests (also known as point-of-need or near-patient tests) where performance is assessed by comparing the results of point-of-care tests with laboratory reference ('Gold') standard test used by Public Health England and composite reference standards which incorporate the results of potentially more than one test and other information about the patient. The proposed studies will be carried out in patients with suspected current or past COVID-19 attending community settings such as NHS general practices enrolled with the RCGP-RSC and national COVID-19 testing centres.

Adult patients (aged ≥16 years) with suspected current or past COVID-19 will be asked to consent to:
1. Use at least one, but the intention is to assess multiple, POCTs for COVID-19
2. Answer a short questionnaire about eligibility and their clinical details
3. Submit an oropharyngeal/nasopharyngeal (OP/NP) swab for laboratory COVID-19 real-time polymerase chain reaction (RT-PCR) to PHE
4. The study team accessing their NHS electronic health records (EHRs) in the future
5. Further contact from the study team to track symptoms and health status after the first study visit
6. A second visit for additional serology testing

The parent or legal guardian of children (aged <16 years) with suspected current COVID-19 will be asked to consent the child to:
1. Use at least one, but the intention is to assess multiple, POCTs for COVID-19
2. Answer a short questionnaire about eligibility and their clinical details
3. Submit an OP/NP swab for laboratory COVID-19 RT-PCR to PHE
4. The study team accessing their NHS EHRs in the future
5. Further contact from the study team to track symptoms and health status after the first study visit

Previous intervention:
RAPid Community Testing fOR COVID-19 (RAPTOR-C19) incorporates a series of prospective observational diagnostic accuracy studies of COVID-19 point-of-care diagnostic tests (also known as point-of-need or near-patient tests) where performance is assessed by comparing the results of point-of-care tests with laboratory reference ('Gold') standard test used by Public Health England and composite reference standards which incorporate the results of potentially more than one test and other information about the patient. The proposed studies will be carried out in patients with suspected current or past COVID-19 attending community settings such as NHS general practices enrolled with the RCGP-RSC and national COVID-19 testing centres.

Adult patients (aged ≥16 years) with suspected current or past COVID-19 will be asked to consent to:
1. Use at least one, but the intention is to assess multiple, POCTs for COVID-19
2. Answer a short questionnaire about eligibility and their clinical details
3. Submit an oropharyngeal/nasopharyngeal (OP/NP) swab for laboratory COVID-19 real-time polymerase chain reaction (RT-PCR) to PHE
4. Submit blood samples for PHE COVID-19 laboratory antibody testing
5. The study team accessing their NHS electronic health records (EHRs) in the future
6. Further contact from the study team to track symptoms and health status after the first study visit
7. A second visit for additional serology testing

The parent or legal guardian of children (aged <16 years) with suspected current COVID-19 will be asked to consent the child to:
1. Use at least one, but the intention is to assess multiple, POCTs for COVID-19
2. Answer a short questionnaire about eligibility and their clinical details
3. Submit an OP/NP swab for laboratory COVID-19 RT-PCR to PHE
4. The study team accessing their NHS EHRs in the future
5. Further contact from the study team to track symptoms and health status after the first study visit

Intervention Type
Other

Primary outcome measure
'Standard' diagnostic accuracy of point-of-care tests for active COVID-19 infection with reference to the Public Health England reference standard, measured at baseline visit

Secondary outcome measures
Current secondary outcome measures as of 16/03/2022:
1. 'Standard' diagnostic accuracy of point-of-care tests for past COVID-19 infection with reference to the Public Health England reference standard, measured at baseline visit
2. 'Enhanced' diagnostic accuracy of POCTs for active COVID-19 infection assessed against a composite reference standard using multiple tests data, linked electronic health records data, and patient-reported outcomes data, measured at baseline visit, follow-up visit (day 28) and follow-up in EHR

Previous secondary outcome measures:
1. 'Standard' diagnostic accuracy of point-of-care tests for past COVID-19 infection with reference to the Public Health England reference standard, measured at baseline visit
2. 'Enhanced' diagnostic accuracy of POCTs for active COVID-19 infection assessed against a composite reference standard using multiple tests data, linked electronic health records data, and patient-reported outcomes data, measured at baseline visit, follow-up visit (day 28) and follow-up in EHR
3. 'Enhanced' diagnostic accuracy of POCTs for past COVID-19 infection assessed against a composite reference standard using multiple tests data, linked electronic health records, and patient-reported outcomes data, measured at baseline visit, follow-up visit (day 28) and follow-up in EHR

Overall study start date
01/04/2020

Completion date
31/05/2024

Eligibility

Key inclusion criteria
1. Adults (aged ≥16 years)
2. Males or females
3. With suspected current or past COVID-19 infection*
4. Having OP/NP swab for laboratory COVID-19 RT-PCR as part of clinical care/testing
5. Willing and able to give informed consent for participation in the study

1. Children (aged <16 years)
2. Males or females
3. With suspected current COVID-19 infection*
4. Having OP/NP swab for laboratory COVID-19 RT-PCR as part of clinical care/testing
5. Parent or legal guardian is willing and able to give informed consent for participation in the study

* As the clinical features of COVID-19 are broad, especially in older or immunosuppressed individuals, restricting testing to a narrow spectrum of clinical features would lead to a limited in-context evaluation. The working definition of suspected current or past COVID-19 infection will be based on the current advice to consider COVID-19 infection in people who during the COVID-19 pandemic have:
1. Symptoms thought to be associated with COVID-19, including but not limited to: fever, cough, fatigue, dyspnoea, sputum production, shortness of breath, myalgia, chills, dizziness, headache, sore throat, hoarseness, nausea or vomiting, diarrhoea, nasal congestion
2. Acute respiratory distress syndrome
3. Either clinical or radiological evidence of pneumonia
4. Atypical presentations, for example an acute functional decline or frailty syndrome in an older person, if they are immunocompromised
5. Lived or worked in close contact with somebody who has tested positive for COVID-19, including NHS staff

Participant type(s)
Patient

Age group
Mixed

Lower age limit
16 Years

Sex
Both

Target number of participants
Planned Sample Size: 2000; UK Sample Size: 2000

Total final enrolment
2262

Key exclusion criteria
1. Adults unable to understand the study information and give consent to take part in the study
2. Need for immediate hospitalisation
3. Previously enrolled in this study in relation to the individual test being evaluated

Date of first enrolment
29/10/2020

Date of final enrolment
15/03/2024

Locations

Countries of recruitment
England

United Kingdom

Study participating centre
University of Oxford
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Sponsor information

Organisation
University of Oxford

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Sponsor type
University/education

Funder(s)

Funder type
Government

Funder Name
UK Research and Innovation

Alternative Name(s)
UKRI

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Funder Name
Medical Research Council

Alternative Name(s)
Medical Research Council (United Kingdom), UK Medical Research Council, MRC

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Funder Name
Lumira DX UK Ltd

Funder Name
Roche Diagnostics

Alternative Name(s)
Roche Diagnostics Corporation

Funding Body Type
Private sector organisation

Funding Body Subtype

For-profit companies (industry)

Location
United States of America

Funder Name
NIHR

Results and Publications

Publication and dissemination plan
The investigators will be involved in reviewing drafts of the manuscripts, abstracts, press releases and any other publications arising from the study. Authors will acknowledge that the study was funded by UKRI-MRC and any other funding that is secured. Authorship will be determined in accordance with the ICMJE guidelines and other contributors will be acknowledged. Planned publication in a high-impact peer-reviewed journal.

Intention to publish date
31/12/2024

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study will be stored in a non-publically available repository
uMed: The core principle applied throughout the RAPTOR-C19 study and across the wider uMed platform is that uMed always acts as a data processor on behalf of the sites that are taking part in this study. This data processing agreement allows uMed to capture and utilise EHR data from the practice to provide services to support the delivery of studies. uMed conforms to the requirements of UK General Data Protection Regulation (UK GDPR), the NHS Data Protection & Security Toolkit, and ISO 27001.
Oxford-Royal College of General Practitioners Clinical Informatics Digital Hub (ORCHID): The ORCHID hub manages patient record information. Currently, the ORCHID hub will be hosted by NHSX in the Azure environment. This platform allows for a rapid implementation of both storage and computation while ensuring data integrity through network segmentation and encryption.
Source documents are where data are first recorded, and from which participants' CRF data are obtained. These include, but are not limited to, hospital records (from which medical history and previous and concurrent medication may be summarised into the CRF), clinical and office charts, laboratory and pharmacy records, diaries, microfiches, radiographs, and correspondence. Source documents are where data are first recorded, and from which participants' eCRF data are obtained. eCRF entries will be considered source data if the eCRF is the site of the original recording (e.g. there is no other written or electronic record of data). All eCRF data will be uploaded to a server within the NDPCHS secure network.
Patient identifiable information is kept for less than 3 months after the study has finished. Research data will be archived for 10 years after the completion of the project.
Direct access will be granted to authorised representatives from the Sponsor and host institution for monitoring and/or audit of the study to ensure compliance with regulations. uMed cannot use or share provider data with any third party without permission from the

practice (data controller in respect of clinical data and care). Consequently, the uMed platform includes provision for an authorisation workflow to enable the practice to give permission(s) for engagement and/or sharing of data in line with the RAPTOR study protocol. This process also ensures that an audit trail is created such that the Sponsor is able to confirm all required permissions have been given by each site. eCRF data collected by uMed will be uploaded to a server within the NDPCHS secure network at least once a week.
Results will be presented according to the Standards for Reporting Diagnostic accuracy studies (STARD) guidelines for reporting diagnostic studies.
Descriptive analysis: Characteristics of recruited participants will be summarised using tables and graphs. If applicable, these will be compared to estimates from the general population. A number of total valid tests by POCT and reference standards will also be reported (actual and percentages), stratified by children vs adults and by age groups (if feasible dependent on total counts).
Summary statistics of diagnostic accuracy: Sensitivity, specificity, positive and negative predictive values for each point of care test (POCT) will be calculated with exact 95% confidence intervals. Results will be stratified for adults vs children and by age groups and spectrum of disease data (if feasible dependent on total counts).
Consent is obtained from participants. All eCRFs will be completed electronically and uploaded using a secure web-based system on uMed.
On all study-specific documents except the consent form, the participant will be referred to by the study participant ID number, not by name.
Each unique patient within the ORCHID hub is anonymised at source before their data is extracted from individual practices using a computer-generated patient ID number. The ORCHID hub holds no identifiable data and only hashed NHS number. This pseudonymised patient-level data extracted from general practice CMR systems such as EMIS (Egton Medical Information Systems, UK) and SystmOne TPP (The Phoenix Partnership, UK), will include demographic data, clinical event data coded with SNOMED CT (SNOMED International, UK), medication data coded with dm+d and free-text entries. Encrypted data will be transported securely to the protected ORCHID hub, initially through providers such as the Azure environment (Microsoft Corporation, USA) hosted by NHSX. In this environment, we will create an extract, transform, and load (ETL) process that will convert the EMIS and TPP data into the OMOP Common Data Model (CDM) and map to the Standardized Vocabularies (19). The implementation will be carried out using a collection of automated scripts (i.e. SQL) to enable the ETL process to be repeatable.
Data shared by non-RSC settings will be de-identified. There will be no linkage to ORCHID or any other data.
All data handling and management will follow the University of Oxford SOPs.
uMed applies the latest cloud-based security principles to ensure that data is held securely on uMed's Amazon Web Service (AWS) infrastructure. In addition to conforming to the standards set by NHS Digital, the uMed platform goes beyond this to create a gold standard for information security of health data. It achieves this by ensuring patient identity information is always separated from the sensitive health data with a multi-stage encrypted communication layer that prevents the complete, identifiable patient record from being accessed by a legitimate or maleficent actor (including uMed's internal staff).
The ORCHID Hub is compliant with Data Protection Legislation, which relates to the protection of individuals with regards to the Processing of Personal Data to which a Party is subject, including the Data Protection Act 2018 and EC Directive 95/46/EC, and the subsequent UK General Data Protection Regulation (UKGDPR). It is also compliant with the NHS Digital Data Security and Privacy policy and is subject to data sharing agreements with all concerned such as NHSX. The University of Oxford is Data Security and Privacy toolkit (DSP) compliant.
Pseudonymisation of data will ensure that the work meets the common law right to privacy.

IPD sharing plan summary

Stored in non-publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	version V1.0	05/06/2020	20/07/2020	No	Yes
Participant information sheet	version V1.1	05/06/2020	20/07/2020	No	Yes
Participant information sheet	version V1.1	05/06/2020	20/07/2020	No	Yes
Participant information sheet	version V1.1	05/06/2020	20/07/2020	No	Yes
Protocol file	version V1.1	08/06/2020	20/07/2020	No	No
Protocol article	protocol	08/02/2021	10/02/2021	Yes	No
Protocol file	version 2.0	14/08/2020	07/04/2021	No	No
Protocol file	version 3	06/01/2021	07/04/2021	No	No
Protocol file	version 4	28/01/2021	07/04/2021	No	No
Protocol file	version 5	18/03/2021	07/04/2021	No	No
Participant information sheet	10-15 years old version 2.0	05/01/2022	16/03/2022	No	Yes
Participant information sheet	6-9 years old version 2.0	05/01/2022	16/03/2022	No	Yes
Participant information sheet	<6 years old version 1.1	05/06/2020	16/03/2022	No	Yes
Participant information sheet	Adults version 2.0	05/01/2022	16/03/2022	No	Yes
Participant information sheet	Young people version 2.0	05/01/2022	16/03/2022	No	Yes
Protocol file	version 6	05/01/2022	16/03/2022	No	No
HRA research summary			28/06/2023	No	No
Results article	Roche-branded SD Biosensor Standard™ Q SARS-CoV-2 Rapid Antigen Test and/or BD Veritor™ System for Rapid Detection of SARS-CoV-2	21/07/2023	24/07/2023	Yes	No
Results article	LumiraDx™ SARS-CoV-2 and influenza A or B assay	15/12/2023	10/04/2024	Yes	No
Plain English results			06/02/2025	No	Yes
Protocol file	version 6.1	10/05/2022	06/02/2025	No	No

Protocol file	version 6.2	08/08/2022	06/02/2025	No	No
Protocol file	version 7.0	14/10/2022	06/02/2025	No	No
Protocol file	version 8.0	29/03/2023	06/02/2025	No	No