









Supplementary Material 1. Examples of serology testing initiatives in Europe, as of July 2020*

Regional	Recommendations on Serology Tests
 European Commission European Commission (EC)	<ul style="list-style-type: none"> • Not recommended for diagnosis; RT-PCR tests are recommended over serology tests for SARS-CoV-2 detection • Recommend serology testing for large-scale sero-epidemiology surveys of population; possibility to help with de-escalation strategies once pandemic is controlled. • EU legislation [1] lists several requirements for diagnostic tests, in general • There are no uniform EU regulations or reimbursement recommendations for SARS-CoV-2 serology test
 European Centre for Disease Control (ECDC)	<ul style="list-style-type: none"> • The ECDC's 10th Coronavirus Update (June 11,2020) [2] recommends a testing strategy and includes serology testing for sero-epidemiological studies. The recommendations note that to guide response and/or the reintroduction of measures, Member States need to implement surveillance systems that are: <ul style="list-style-type: none"> ○ “sufficiently sensitive and timely to detect an upsurge of cases; ○ representative of the general population and the entire national territory to tailor response measures; and ○ comprehensive enough to ensure that all cases are detected, including those living in high-risk settings. • To address these objectives, ECDC proposes multiple complementary testing methods: <ol style="list-style-type: none"> 1. Comprehensive testing of all people with COVID-19-compatible symptoms. 2. Testing of persons displaying symptoms compatible with COVID-19 as part of syndrome-based surveillance systems. 3. Systematic random or comprehensive testing of high-risk populations or settings, irrespective of symptoms (e.g., healthcare workers, LCTFs). 4. Testing of close contacts. 5. Random testing of the general population, irrespective of symptoms (point prevalence studies). 6. Testing of serological markers (sero-epidemiological studies).” • The ECDC recommends conducting sero-epidemiological studies by testing different cohorts of the population in community or in high-risk settings.
Country	Serology Testing Strategies and/or Actions
 France	<p>Summary: In France, the national health department (HAS) released guidelines on serology testing in May 2020 and both ELISA and RDT serology testing are available. The indication of serology testing is varied—initial diagnosis combined with PCR, etiological diagnosis without PCR results, and sero-epidemiological population-based studies (prioritization for healthcare workers). Tests are free of charge when prescribed. Antibody tests are also available for purchase by the wider public with no prescription needed and at their own cost. However, health authorities have said that people should still consult a doctor when interpreting results.</p> <ul style="list-style-type: none"> • Guidelines from the Haute Autorité de Santé (HAS) exist from May 20, 2020. The detection of serum anti-SARS-CoV-2 antibodies through an automated method or RDT is carried out with a medical prescription with the following indications: <ul style="list-style-type: none"> ○ Diagnosis of symptomatic patients with suggestive CT scan and negative or non-available gene amplification;

	<ul style="list-style-type: none"> ○ Antibody detection in non-symptomatic healthcare professional during screening and detection of contacts after negative gene amplification, only on an individual basis; ○ Detection of antibodies in non-symptomatic collective accommodation staff during screening and detection of contacts after negative gene amplification, only on an individual basis. • Guidelines call on positive RDT to be confirmed by ELISA. • Otherwise, people do not need to have a “particular reason” or a prescription to purchase a test. Rapid tests cost from €9.45 up to around €15 in some pharmacies. Public authorities recommend that they contact a healthcare professional (e.g., general practitioner) to then interpret the results of the test.
 <p>Germany</p>	<p>Summary: In Germany, serology tests are not widely available to the general population and are still under investigation to ascertain their efficacy. Nevertheless, they have been used for several research studies.</p> <ul style="list-style-type: none"> • The Robert Koch Institute (RKI), Germany’s public health institute, is following a three-pronged approach: <ul style="list-style-type: none"> ○ Serological examination of blood donors: Starting in April 2020, 5,000 blood samples from adults were examined every 14 days to learn what percentage have antibodies present. ○ Serological examination of COVID-19 hot spots in Germany: A representative sample of approximately 2,000 volunteers who are over 18 years and living in harder-hit areas within Germany were examined several times. These volunteers will also be asked questions about clinical symptoms, previous illness, health behavior, living conditions, and mental health. This study started in mid-April 2020. ○ Nationwide population representative screening: 15,000 people over the age of 18 are being examined at 150 study locations around the country. These people are meant to be a representative sample of the country. • In July 2020, a study by the Helmholtz Centre for Infection Research (HZI) started testing around 3,000 blood samples from residents in the southern German town of Reutlingen for antibodies created when immune system fights the coronavirus. Scientists will conduct five different antibody tests on each sample. The study will take place over a period of one year, with additional blood samples being collected and tested again in selected districts across Germany four and eight months after the first survey. <p>German scientists from the University of Bonn conducted some of the world’s first COVID-19 antibody studies in the hard-hit town of Gangelt, where it found community infection rates of nearly 14%.</p>
 <p>Italy</p>	<p>Summary: In Italy, information on overall public health strategies/actions regarding serology testing as a response measure to SARS-CoV-2 is unclear, yet it has been used for sero-epidemiological purposes.</p> <ul style="list-style-type: none"> • On 25 May, the health ministry and statistics agency, ISTAT, started a survey of the seroprevalence of infection of the SARS-CoV-2 virus, in collaboration with the Italian Red Cross. • A sample of 150,000 people in 2,000 towns and cities, split by sex, occupation and six age brackets, will be tested. The aim of this study is to identify how many people in Italy have developed antibodies to the virus, even in the absence of symptoms.[3]

 <p>Spain</p>	<p>Summary: In Spain, serology testing has been used for sero-epidemiological purposes but there is no evidence that serology testing is part of Spain's overall public health policy response.</p> <ul style="list-style-type: none"> Between April 27 and May 11, 2020, the first wave of a study, including 61,000 randomly selected households, was conducted by the Ministry of Health, the Institute of Health Carlos II, and the collaboration of autonomous communities in Spain. The study known as ENE-COVID, used two serology tests for IgM and IgG detection: a POC one and LFI assay. ENE-COVID has been used to provide seroprevalence data at regional level to inform national and local public health policies.[4] Serology tests can also be purchased individually, out-of-pocket.
 <p>Sweden</p>	<p>Summary: In Sweden, there is no clear policy on serology testing. However, several studies have been conducted for sero-epidemiological data and serology testing is on the rise throughout the country.</p> <ul style="list-style-type: none"> A government correspondence from June 25, 2020, communicated that all regions in the country have increased their serology testing capacity.[5] The Public Health Agency of Sweden claimed that [6], as of May 13, 2020, there were no reliable serology tests yet available but that when they do become available, they "will primarily be used for testing healthcare and social care staff". It also calls against using serology testing for diagnosis during "acute illness". A few studies have been conducted in Sweden using serology tests. One of them was conducted in May 2020 by the Karolinska University Hospital [7], in which approximately 11,000 hospital employees submitted samples that were tested with both PCR tests as well as antibody tests.
 <p>United Kingdom (UK)</p>	<p>Summary: In the UK, it appears that while the National Health System (NHS) had been hopeful initially, they currently do not believe antibody tests are an effective method to significantly mitigate the impact of the virus. Nevertheless, it is part of their national testing strategy but is only available for free to a limited number of people. Others who wish to access serology tests are required to do so at their own cost.</p> <ul style="list-style-type: none"> Serology testing is part of the four pillars in the UK testing strategy: <ul style="list-style-type: none"> Pillar 1: swab testing in Public Health England (PHE) labs and NHS hospitals for those with a clinical need, and health and care workers Pillar 2: swab testing for the wider population, as set out in government guidance Pillar 3: serology testing to show if people have antibodies from having had COVID-19 Pillar 4: blood and swab testing for national surveillance supported by PHE, the Office for National Statistics (ONS), and research, academic, and scientific partners to learn more about the prevalence and spread of the virus and for other testing research purposes, such as the accuracy and ease of use of home testing. As of April 2020, the NHS was engaged with several companies and was testing the quality, accuracy, and effectiveness of potential tests with scientific experts and regulators. The NHS has bought some antibody testing kit stock based on minimum initial volumes to enable clinical testing. If the outcome of this study is that the serology tests do not work, no further tests will be purchased and, where possible, orders will be cancelled. If shown to be successful, the NHS hopes to deploy serology testing kits

	<p>in their millions. In time, and subject to clinical advice, they could even be used to inform the use of social distancing measures in the future.[8]</p> <ul style="list-style-type: none"> • Free serology testing is not widely available yet. It is currently only offered to NHS staff, as well as some hospital patients and care home residents. • Home POC serology test kits are not recommended, as it has not yet been confirmed if they are safe and reliable. • Individuals must pay for a test to be done at a private clinic if they want to.[9]
<p>*Bold text used for emphasized herein.</p> <p>[1] Source: EUR-Lex. Access to European Union Law. Available at: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31998L0079.</p> <p>[2] Source: ECDC (June 11, 2020) Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK – tenth update. Available at: https://www.ecdc.europa.eu/sites/default/files/documents/RRA-COVID19-update10-2020-06-11.pdf</p> <p>[3] Source: Ministero della Salute (May 26, 2020). Seroprevalence survey in Italy. Available at: http://www.salute.gov.it/portale/nuovocoronavirus/dettaglioNotizieNuovoCoronavirus.jsp?lingua=english&menu=notizie&p=dalministero&id=4814.</p> <p>[4] Source: Pollán M., Pérez-Gómez B., M., Oteo J., Hernán M.A., Pérez-Olmeda M., et al. (2020). Prevalence of SARS-CoV-2 in Spain (ENE-COVID): a nationwide, population-based sero-epidemiological study The Lancet. Published online. Available at: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31483-5/fulltext.</p> <p>[5] Source: Government Offices of Sweden (June 25, 2020). Available at: https://www.government.se/49eca8/globalassets/government/dokument/utrikesdepartementet/diplomatportalen/update-testing-covid-19.pdf</p> <p>[6] Source: Public Health Agency of Sweden (August 12, 2020). FAQ about COVID-19. Available at: https://www.folkhalsomyndigheten.se/the-public-health-agency-of-sweden/communicable-disease-control/covid-19/.</p> <p>[7] Source: Pramsten S. (May 5, 2020). Studie: 15 procent på Karolinska har haft viruset. Available at: https://lakartidningen.se/aktuellt/nyheter/2020/05/studie-15-procent-pa-karolinska-har-haft-viruset/.</p> <p>[8] Source: Department of Health and Social Care. England (April 04, 2020). Coronavirus (COVID-19) Scaling up our testing programmes. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/878121/coronavirus-covid-19-testing-strategy.pdf.</p> <p>[9] Source: NHS. (August 07, 2020). Antibody test to check if you have had coronavirus. Available at: https://www.nhs.uk/conditions/coronavirus-covid-19/testing-and-tracing/antibody-test-to-check-if-youve-had-coronavirus/.</p>	