European Commission

EU research and innovation in action against the coronavirus: funding, results and impact

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Knowledge and innovation save lives. Since the start of the COVID-19 outbreak, EU research and innovation has been one of our most impactful tools to tackle the disease. And it will also provide solutions to major concerns of citizens, frontline workers, policy makers and industry for living with the virus in the years to come.

Mariya Gabriel, Commissioner for Innovation, Research, Culture, Education and Youth

Over 425,000 Europeans have succumbed to COVID-19 in the first year of the pandemic, and over 2 million people worldwide, according to the European Centre for Disease Prevention and Control (ECDC). Since the start, the European Union has been at the forefront of supporting research and innovation (R&I) and coordinating European and global research efforts, including preparedness for pandemics, launching its first emergency call for on 30 January 2020 – the same day that the World Health Organisation declared COVID-19 a Public Health Emergency of International Concern.

The European Commission pledged just over **€1 billion from Horizon 2020,** the EU's Research and Innovation Programme (2014-2020), to tackle the pandemic, of which €780.8 million has already been mobilised.

So far, **€602.3 million** has been awarded **to support research and innovation projects** to tackle many aspects of the pandemic. These projects address the development of diagnostics, treatments, vaccines (see factsheet), epidemiology, preparedness and response to outbreaks, socioeconomics, mental health, production and digital technologies, as well as the infrastructures and data resources that enable this research. A further €21.4m in grants will be awarded in the coming months.

This factsheet provides the second snapshot of a comprehensive analysis of a portfolio of 105 new EU COVID-19 research and innovation projects that are receiving €469 million in funding, with results and impacts. Commission Real-time updates are available on the European Commission dedicated coronavirus R&I website.

It also mobilised €400 million in financing from the Horizon 2020 InnovFin, including InnovFin EFSI and Infectious Diseases Finance Facility (IDFF) of which **€178.5 million** has been allocated to accelerate the development of vaccines (e.g. the Covid-19 champion BioNTech and CureVac) and other interventions, drugs, medical and diagnostic devices (e.g. Scope Fluidics) or novel critical research and innovation infrastructures (including production facilities). A further €221.6 million in IDFF financing will be awarded in the remaining months of the programme.

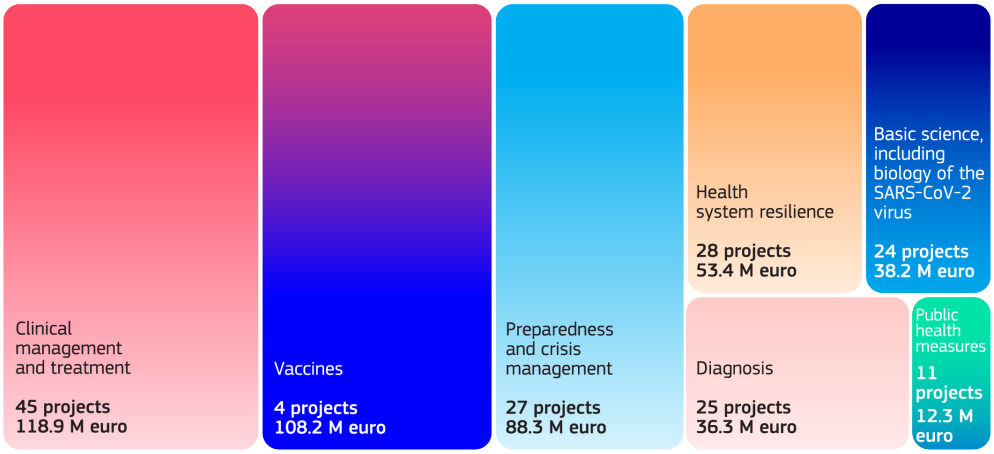
Research and Innovation

These actions contribute to the implementation of the 2020 ERAvsCorona action plan, developed by Commission services and national administrations, which lays out 10 priority short-term actions in research and innovation to tackle coronavirus.

Building on the investments of 2020, the Commission remains committed to boosting spending on coronavirus research and innovation, as well as in other emerging infectious health threats. The new programme for research and innovation, Horizon Europe (2021-2027) will provide a wide range of funding and financing opportunities.

1. EU funding to combat COVID-19: focus on treatment, vaccines and crisis management

FIGURE 1: DISTRIBUTION OF COVID-19 H2020 PROJECTS ACCORDING TO MAJOR NEEDS BY ESTIMATED EU FINANCIAL CONTRIBUTION (M EURO)



New "lab-to-fab" platform for fast deployment of COVID-19 solutions.

The INNO4COV-19 project will assist companies with grants through open calls for up to 30 test cases and applications spanning from medical technologies, environmental surveillance systems, sensors, protection of healthcare workers and Artificial Intelligence and Data mining, to support the fast deployment of solutions to fight COVID-19.

Monitoring the health of individuals globally.

The ORCHESTRA project aims to create a new pan-European cohort that will collect data on SARS-CoV-2 infected and non-infected individuals of all ages and conditions and on patient care. More than 300.000 individuals from Europe, India, South America and Africa are already included in the cohorts.

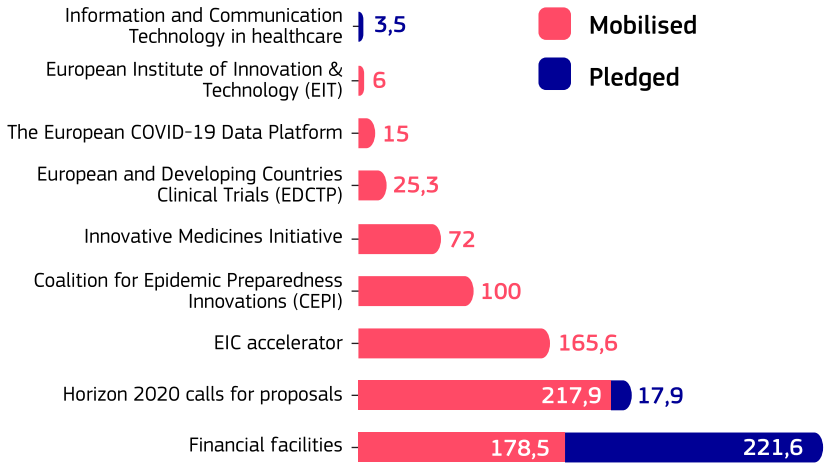
Validating new treatments.

The REMAP-CAP trial - supported through the PREPARE and RECOVER projects, as well as other funders, recently confirmed that two immunosuppressant drugs – tocilizumab and sarilumab – normally used to treat rheumatoid arthritis, are effective against COVID-19, significantly reducing time spent by patients in intensive care and lowering risk of death by almost a quarter.

A global data sharing platform for COVID-19.

The **European COVID-19 Data Platform,** hosted by the European Open Science Cloud (EOSC), is a free-to-use, open digital space for researchers to share and upload data sets. Since its launch on 20 April, it has seen more than 114 000 users and 3.6 million web requests from over 170 countries. The platform already offers access to more than half a million records of bimolecular data and publications, viral sequences (>46 000), sequences from patients, and other microbiological data.

FIGURE 2: DISTRIBUTION OF THE €1 BILLION INVESTED IN 2020 BY THE EU IN RESEARCH AND INNOVATION TO COMBAT COVID-19 (M EUROS)



The large amount of funding for clinical management and treatment, vaccine development and diagnostics reflects the strong global commitments of the European Union to fight the pandemic. Engineering and repurposing production systems for emergency medical supplies and new digital telemedicine are expected to strengthen the health system's resilience.

Evidence-based public health measures will especially focus on vulnerable populations. They will deliver solutions or inform policymakers about managing the crisis and being better prepared for future pandemics. This is underpinned by fundamental research to improve our understanding of the SARS-CoV-2 virus, funding for data science, and flexible, adaptable clinical infrastructures.

The Horizon 2020-financed Infectious Diseases Finance Facility (IDFF) supports therapeutic development.

Under the joint EU-EIB financial instrument IDFF, Atriva Therapeutics (DE) signed a financing agreement of €24 million for the research, development and clinical testing of the company's lead product candidate to influenza and COVID-19 treatments. Atriva's ATR-002 molecule may prevent progression to critical-stage COVID-19 in hospitalised patients and holds strong potential in the current pandemic.

Immunic (DE) also signed an IDFF financing agreement of up to €24.5 million to support the development of Immunic's lead candidate, IMU-838, is currently being evaluated for the treatment of moderate COVID-19 patients.

In November 2020, €15 million deal was signed with AB Science (France) for their clinical development of Masitinib (small molecule) for the treatment of patients with COVID-19.

Applying artificial intelligence to COVID-19 R&I.

The COVID-19 crisis accelerated the digital transition and the use of artificial intelligence (AI) across society. And it has enabled us to gain invaluable time and save lives by identifying target molecules for treatments and vaccines and reducing infection spread through faster diagnostic tests. AI also improves patients' clinical management via automatic reading of medical images and better organising health care and logistics.

The **Exscalate4Cov** project has carried out the most complex supercomputing simulation ever using AI. More than 70 billion molecules were simulated on the 15 active interaction sites of the virus for a total of over a thousand billion interactions evaluated in just 60 hours. Results were available in real time, recorded and registered here. Out of 400,000 potential candidates, 40 were identified as 'promising' and the most promising – Raloxifene – is now undergoing a clinical trial.

The **DRAGON** project, funded through the Innovative Medicines Initiative (IMI), aims to use artificial AI and machine learning to develop a decision support system capable of delivering a more precise coronavirus diagnosis and more accurate predictions of patient outcomes.

Co-funded by the European Research Council through the **EAR** project, Cecilia Mascolo (University of Cambridge, UK) has launched a new mobile phone app. This app will be used to collect data to develop machine-learning algorithms that could automatically detect whether a person is suffering from COVID-19 based on the sound of their voice, their breathing and coughing.

2. EU-funded R&I projects catalysed strong cooperation in COVID-19 in Europe and globally

EU R&I COVID-19 projects foster collaboration across sectors and between organisation types, including public bodies, private entities (companies), research organisations, universities and other organisations such as civil society organisations.

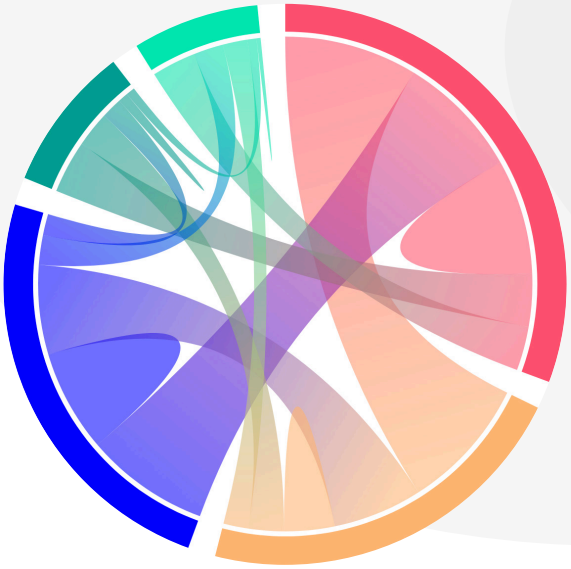


FIGURE 3:
COLLABORATIONS BETWEEN THE DIFFERENT TYPE OF PARTICIPANTS

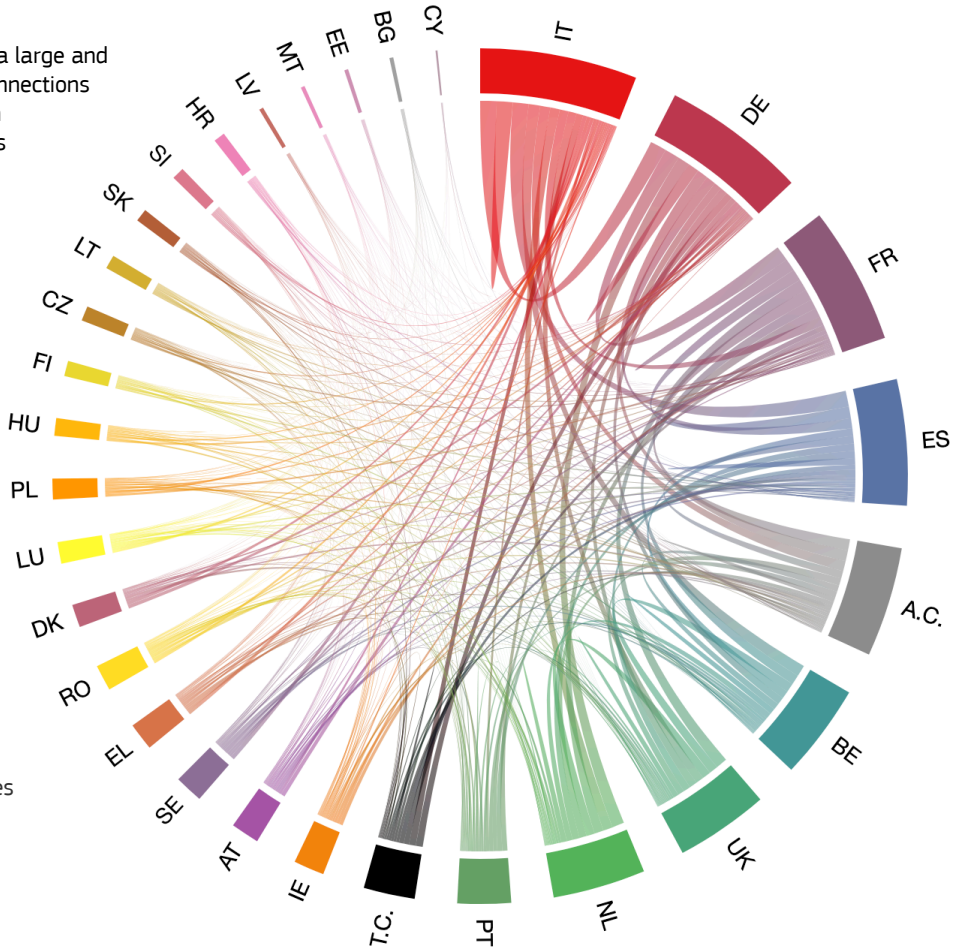
- Higher or Secondary Education Establishments
- Research and Technology Organisations
- Private for-profit entities (excluding Higher or Secondary Education Establishments)
- Public bodies (excluding Research Organisations and Secondary or Higher Education Establishments)
- Others

The 105 COVID-19 specific projects have enabled a large and dense collaboration network, with almost 7000 connections of organisations across 50 countries, ranging from 18 connections in Cyprus to over 1654 connections in Italy. On average, organisations from Member States collaborate in European R&I Covid-19 projects together with organisations from 25 other Member States and make up 78% of connections. Organisations from Associated countries (Albania, Bosnia-Herzegovina, Israel, Moldova, Norway, Serbia, Switzerland and Turkey) and third countries (Argentina, Australia, Brazil, Canada, China, Columbia, Congo, Côte d'Ivoire, Gabon, India, Korea, Nepal, South Africa and the United States) are also actively participating in the network with 1037 (15%) and 484 (7%) connections respectively.

FIGURE 4: COLLABORATION BETWEEN COUNTRIES PARTICIPATING IN COVID-19 PROJECTS FUNDED UNDER HORIZON 2020

Base: All participants, including EU27, the UK, associated countries and third countries.

Note: A.C.: Associated Countries; T.C.: Third Countries



MAKING RESULTS MATTER

The **Horizon Results Platform** makes a wealth of EU-funded research results available and enables researchers and other stakeholders to get in contact with the researcher that produced them.

Strong involvement of regulators, financial institutions, civil society and industry will ensure that research results are quickly available - from new vaccines and tests, to health and social care.

The **Manifesto for EU Covid-19 Research** launched by the Commission in July, as part of the common European response to the coronavirus outbreak, maximises the accessibility of research results in the fight against the corona virus. So far, more than 650 organisations (including universities, research institutes and private companies) have endorsed the Manifesto, and 1875 individuals from all over Europe expressed their support.

The European Innovation Council #EUvsVirus Matchathon set a world record with more than 2200 new partnerships for scaling up 120 innovative projects to tackle coronavirus challenges.

A Horizon 2020 Expert Group published a policy review on Gendered innovations, including a study on 'The impact of sex and gender in the COVID-19 pandemic' in November 2020. It highlights why gender matters when it comes to the risk of exposure to coronavirus and the long-term socio-economic consequences in the areas of employment, domestic abuse and inequality.

Behavioural and socio-economic impacts.

R&I projects to improve understanding of the behavioural and socio-economic impacts of the epidemic (with an EU investment of €33 million) will, for instance, provide in depth analysis of responses at the levels of government, public health, community, and information and communications. Involving healthcare providers and patient organisations, these projects examine the dynamics of the outbreak to map and analyse unintended impacts, including on mental health inequalities.

Monitoring mutations.

With the global spread of COVID-19 new variants of the virus have appeared. Researchers of the CoroNab project have evaluated and reported the effects of mutation in the spike protein as observed in new variants of this virus.

3. EU leading global cooperation initiatives

The EU has taken the lead as a global actor and major international aid contributor. Horizon 2020 funding has leveraged the work of existing multilateral research platforms to accelerate efforts to develop effective treatments, vaccines, therapeutics and diagnostics, and to ensure universal availability at an affordable price.

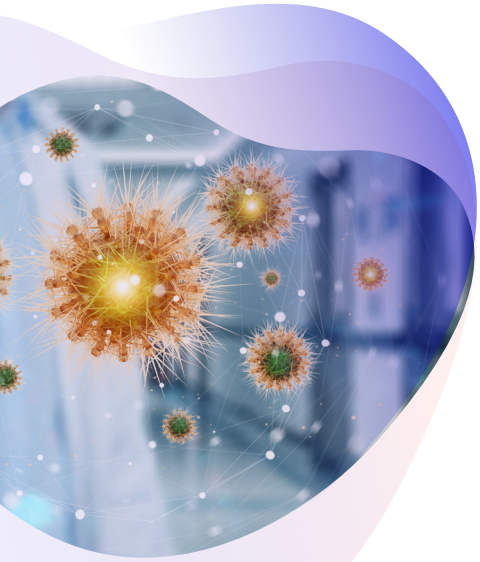
The Coalition for Epidemic Preparedness Innovations (CEPI) received €100 million from Horizon 2020 to co-fund CEPI's call for proposals to support the rapid development and global manufacture of COVID-19 vaccines, in addition to funding from EU member states. In addition, the Global Research Collaboration for Infectious Disease Preparedness (GLOPID-R) has received €2.9 million. The EU is also a founding member of the Access to COVID-19 Tools (ACT) Accelerator, which aims to speed up development, production and equitable access to COVID-19 tests, treatments, and vaccines. To accelerate and scale-up the development and manufacturing of a global supply of vaccines for citizens across the world, in poor and rich countries, the Commission contributes €400 million in guarantees to support COVAX (co-led by Gavi, the Vaccine Alliance, CEPI and WHO) in the context of the Coronavirus Global Response.

Horizon 2020 co-funds the European & Developing Countries Clinical Trials Partnership (EDCTP), focusing on infectious diseases research in sub-Saharan Africa. This public-public partnership has funded 24 projects with a total of €11.45 million aiming to prevent or manage the spread of the outbreak. In addition, EDCTP and its partners are investing €23 million to build research capacity, strengthen regional research networks and establish an African cohort of epidemiologists and biostatisticians through training in institutions in Europe and sub-Saharan Africa.

African-EU cooperation for identifying new COVID-19 treatments.

In November 2020, Thirteen African countries and an international network of research institutions joined forces to launch the largest clinical trial in mild-to-moderate COVID-19 outpatients in Africa. The trial will be conducted by the ANTICOV consortium supported by the EDCTP, the German Federal Ministry of Education and Research, Unitaid, the Swedish government and the Starr International Foundation.

One of the 24 projects, the Africa Suitcaselab study, is evaluating an innovative solar-powered 'laboratory in a suitcase' that can provide rapid results on COVID-19 infections in the field with relatively easy-to-use equipment. The mobile suitcase detects the genetic material of SARS-CoV-2 without the need for the repeated heating and cooling cycles required by PCR-based laboratory tests. The project will play an important role in linking multiple countries in Europe and sub-Saharan Africa. It is also engaging with key regional bodies such as the WHO Regional Office for Africa and the Africa Centre for Disease Control and Prevention, and project partners include several members of the EDCTP-funded ALERRT and PANDORA-ID-NET epidemic preparedness networks.



In addition, **586 other projects** funded by Horizon 2020 and its predecessor, the Seventh Framework Programme were identified as having contributed to scientific knowledge or technologies, such as new disinfectant coatings for protective clothing, safe transport of patients, wastewater treatment or digital applications.

Researchers from two projects – ESPACE and discovAIR – that are part of the European contribution to the Human Cell Atlas consortium have shown that specific cells in the nose and eye are likely Sars-Cov-2 virus entry points, while the lungs are initially less vulnerable, but this changes after infection. These findings are helping inform prevention strategies to block the chain of infection as well as point to new approaches for the development of treatments.

And the Commission's own scientists at the **Joint Research Centre** (JRC) are also contributing with robust scientific evidence and tools to support the EU's response. For example, the JRC has developed reference materials which function as quality assurance tools enabling laboratories to verify whether their RT-PCR tests (which check if an individual has an active coronavirus infection) and antibody tests (which check if an individual has previously been infected by the virus) are functioning properly.

Coronavirus research and innovation

European Commission's Coronavirus response

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