EU R&I actions on COVID19

Written Contribution of Belgium to the discussion between the Member States and the European Commission

1. What should in your view be the **priorities for EU coordinated R&I action on COVID19** in the short (**6 months**) and medium term (**12 months**) and beyond?

Short term:

The short term priorities for EU R&I action can be summarised as follows:

1. Prevention and control;
2. Data-based policy;
3. First-line measures to contain the pandemic;
4. Vaccine trials;
5. Sero-epidemiological research

These five priorities are described below.

1. **Prevention and control:** we need to work on infection prevention and implementation of control measures in healthcare and community settings
2. **Data-based policy:** it became extremely evident how crucial data are. Thanks to good data one can:
    - Measure what is happening. We can map evolution in sequence of the virus, find constant and variable immunogenic regions, as well as to develop serological (and cellular) tests to each of these antigens;
    - Learn from previous pandemics to set up trials for testing multiple intervention options and to reduce stay in intensive care units and mortality;
    - Assess and model the epidemiological, economic, financial and ecological impact of the epidemic, as well as the impact of the measures of prevention, information, care and control taken for fighting against the epidemic. An interdisciplinary approach is a must in order to take all parameters into account.

    Support and foster open access to articles and research data related to COVID-19 and to relevant related topics is therefore a must. It is the simplest and quickest way of allowing experts to learn from existing experiences and networks (such as VALGENT on human papillomavirus test validation and comparison).

    Europe needs a performant **data capturing system for all EU countries** allowing to develop a **European-wide model** including all countries and regions as 'patch' in which the impact of different strategies across borders can be studied. A study case could be The Netherlands and Belgium, as both countries have chosen very different strategies to deal with the current pandemic.

    EMBL's European Bioinformatics Institute (EMBL-EBI) could play a key role in the creation of a European COVID-19 Data Platform for data/information exchange, connected to the European Open Science Cloud (EOSC). Also services and resources of ELIXIR, the ESFRI research infrastructure for life science data, should be fully utilized.

3. **First-line measures** to contain pandemic. The concrete measures we have in mind are the development of quick, simple, and easier method(s) for screening for SARS-CoV-2. A Belgian university (University of Namur) has successfully developed and registrate testing solutions without using the reagents that are in short supply, to make them available to the greatest numbers. To train research staff to use sampling material and diagnostics in a safe way is also required.
4. **Vaccine trials:** it is urgent to create an EU-concerted platform for vaccine trials, for phase 1 to phase 3 studies with candidate vaccines of different producers, with a clear roadmap to roll out across EU-countries.
5. Support to **EU-wide sero-epidemiological research,** which would try to understand the differences in response to virus infection (from no symptoms to deadly consequences) and to therapeutic interventions**.**

   It is urgent to start a collection of samples over different age groups leading to the creation of a biobank of corona-tested samples and repeated it on a periodical basis in order to:

   - Follow and evaluate the development of population-immunity across de EU;
   - Get insight in duration of immunity;
   - Map immunological response after infection, identify and test for correlate of protection. We should also develop quick, simple and easier method(s) for antibody detection from recovered patients

Mid term priorities:

It is clear that finding a vaccine to be prepared for the next wave, should be a top priority. It is therefore important to develop a specific expertise and support for the regulatory aspects for accelerating the development of both vaccine and therapy, as well as to facilitate access to animal models (hACE2 transgenic mice, hamsters, non-human primates).

Other mid-terms priorities should be:

- To build upon the results made available by R&I activities on predictive medicine. For instance, in Belgium two universities (UZ Brussel and VUB) are working on the early detection of infectious disease outbreaks through big data analytics.
- To set European standardised procedures to ensure management and monitoring of the public health emergency should be a mid-term priority.
- To support biosafety 3 labs (BSL3) and training of S&T staff to be able to handle Covid-19 and other highly pathogenic respiratory pathogens.
- To carefully rethink the European production modes. R&I can help to develop new modes of production, anchored on the EU continent, which are more adaptive, more efficient and greener than the current ones. The EU economy needs a production system capable of adapting to crisis and optimising productivity and delivery, and that can be achieved through artificial intelligence and blockchain technologies.
- To ensure an interdisciplinary approach to prepare and prevent future pandemics and the consequences of it on (mental) health, economy, ecology, culture and social life. Research across borders on ‘how to maintain the overall health and welfare of the people in quarantine situation’ should be considered**.**

  It is clear that R&I have a role to play beyond the obvious contributions of the medical sciences, which goes from social psychology to communication sciences.

2. How could Member States and the European Commission best maximise funding eg to complement and expand the 17 Horizon 2020 COVID-19 projects and/or increase the national contributions to the EDCTP call)?

We should:

- Consider to fund the H2020 SC1-PHE-CORONAVIRUS 2020 proposals on the reserve list and below available budget.
- Further invest in a broad influx of novel research lines to increase the chances of coming to solutions within reasonable timeframes. Additional and very flexible funding is also needed to support research ideas based on very recent research results. In order to move fast and cope with the pandemic, we need to ease the rules and shorten selection timelines. In addition, high risk, high gain should be a major criterion for selection.
- Develop mechanisms to ease and increase interaction and exchange with experts in other parts of the globe. Although COVID19 has proven the immense value of open access and open data, there is still a lot of expertise and knowledge build up in hospitals and research centres in China and the US which is of utmost value to the European situation of today but is not openly available.
- Consider stronger involvement of different players, including SME's, by making the calls 'SME friendly'
- Ensure the proper dissemination of the research results towards the relevant end-users beyond the researchers themselves (doctors, journalists, etc.)
- EDCTP: no call is visible on the EDCTP website. If a call is open, this should be broadly spread. The-EU-Africa Global Health Partnership (EDCTP3) has the ambition to increase health security in sub-Saharan Africa and Europe and hence it can become an important partnership in the present context.

3. How to mobilise State long-term investors, given the possibility of co-investment offered by EIC and IDFF? What other initiatives could be taken?

- Leveraging and strengthening the European biotech ecosystem will be of utmost importance to deal with the current pandemic treat. Empowering the interplay between academic research and pharmaceutical companies and especially supporting versatile start-ups in Europe can facilitate a fast and proactive response to this societal challenge.
- In parallel, we need a sustained and long-term support to develop appropriate societal approaches. We see an opportunity to create an ecosystem where innovations (e.g. fast diagnostics, inhaled use, other antiviral therapies,…) can be pursued in early stage and create economic impact.
- When vaccine or other medical solutions will be developed and available, production capacities will also be required so we need to anticipate that. Close-to-the-market funding will be needed to accelerate innovation.
- The EU could provide a platform for collaboration between the industry and the health sector with the purpose of identifying needs, production capabilities, solutions and funding providers, and facilitating collaborations along the value chains leading to innovative solutions;
- The Infectious Diseases Finance Facility (IDFF) could be extended to other topics. A dedicate COVID-19 vehicle under the IDFF could be set;

- Concerning the EIC, the EIC Accelerator call on COVID-19 was extremely useful. The next cut-off date which is scheduled to deal with the Green Deal should also allow COVID-19 related projects (those two themes are by the way intertwined). But the low success rate remains an important bottleneck. A smoothen transition from Corona relevant Pathfinder projects to accelerator pilot for fast track procedure could be consider.
- The Commission could also consider a dialogue with national promotional banks (NPBs) to explore funding needs and co-funding possibilities – also in a collaborative setting between NPBs.
- Ahead of Horizon Europe, the Commission should keep ensuring funding opportunities in support of Innovation Procurement for the sector: Pre-Commercial Procurement (PCP) and Public Procurement of Innovative solutions (PPI).

ADDITIONAL INFORMATION

Relevant R&I initiatives with Belgian experts

Besides the projects SCORE, EXSCALATE4CoV, RECoVER and EpiPose selected under the recent H2020 SC1-PHE-CORONAVIRUS 2020 call, as well as the proposal nCoVMoDRAD on the reserve list, other important projects are:

- Test project from the KU Leuven's Rega Institute for Medical Research: project to launch an into drug therapies for the Covid-19 virus. The project is being funded by the Bill and Melinda Gates Foundation. The aim is to identify a treatment for those who are infected with the virus, not a vaccine (which would take much longer).
- COVID-19 Ag Respi-Strip: accurate antigen testing for severe and critical stages. To deal with the spread of the coronavirus disease 2019 (COVID-19), Coris BioConcept (an SME in Wallonia) has developed a rapid antigen test that can be used for the detection of SARS-CoV-2 in nasopharyngeal secretions. Advantages of the kits for antigen test: results in 15 minutes, no polymerase chain reaction (PCR) needed

  More info: https://www.corisbio.com/Products/Human-Field/Covid-19.php#
- New diagnostic process by the University of Namur: development of a new technique involving manual extract of the genetic code from the virus. The genetic code is then transformed into DNA that is amplified giving a signal indicating whether the patient is affected or not. A reliable result is then obtained in less than 24 hours.

  The process is actually running at UMons and should be rapidly extended to other universities and laboratories around the world.

  More info: https://web.umons.ac.be/fr/une-premiere-plate-forme-de-depistage-du-covid-19-operationnelle-au-benefice-du-hainaut-au-sein-de-lumons/
- A simplified prototype was designed and tested at UGent (Faculty of Engineering & Architecture in collaboration with the Faculty of Medicine) that can be used for the ventilation of corona patients. The prototype has already been tested on a breathing machine in the hospital of Aalst. Industrial Research Fund is being released for the further development of this equipment.
- Virology laboratory at the Leuven Rega Institute - KULeuven received 15,000 medicinal molecules from Scripps Institute in California and will test them in the Rega's high-biosecurity lab for their potential activity against the new coronavirus. The lab is custom designed and runs fully automatically, day and night, seven days a week and is the only

one in the world. The costs for this research are covered by the Bill & Melinda Gates Foundation

- A group at the Life Sciences Institute at UCLouvain is studying the binding of the coronavirus to its receptor on infected cells. As they have recently done with rotavirus, they are trying to synthesize peptides that can block the interaction of the receptor with the virus and thus the infection. This could lead to a drug that cures the disease, much like an antibiotic for bacteria.
- UCLouvain researchers together with 200 volunteer staff members have designed, developed and clinically tested an innovative prototype “Breath4Life” artificial respirator. It can be delivered within a week.
- ULiège works on the generation of radiomic signatures, based on thoracic scans of patients infected with Covid-19 in order to propose a better management of infected patients.
- The Polytechnic Faculty of UMons conducts AI research and analysis of lung X-rays. The aim is to develop an artificial intelligence system based on Deep Learning that allows automatic detection of COVID-19 using chest X-ray images.
- UCLouvain has launched a large scale population mental health survey in the context of the current health crisis.

DisCoVeRy trial: this clinical trial was launched this week in France to test four experimental treatments against COVID-19 and is expected to enrol 3,200 participants across several European countries including Belgium. The Flemish Supercomputer Center (VSC) provides calculation time for research around Covid-19 for both academics and companies. The VSC is also working with the Institute of Tropical Medicine in Antwerp on a project on inhibitors against Covid-19 to apply drug design tools developed within an awarded Tier-1 project to the protease of Covid-19.

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