Cour des comptes

FLASH AUDIT

FUNDING FOR PUBLIC RESEARCH IN THE FIGHT AGAINST THE COVID-19 PANDEMIC

July 2021

This document, which was subject to a right of reply from the recipients concerned, was deliberated by the Court of Accounts on 17 June 2021

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PROCEDURES AND METHODS

Court of Accounts reports are produced by one of the Court's six chambers or by a group involving several chambers and/or several regional or territorial chambers of accounts.

Three fundamental principles govern the organisation and activity of the Court as well as of the regional and territorial chambers of accounts, thus the performance of their audits and investigations as well as the preparation of the resulting public reports: independence, review and collegiality.

The **institutional independence** of the financial courts and the statutory independence of their members ensure that the audits conducted and the conclusions drawn are done with complete freedom of assessment.

Review implies that all findings and assessments made during an audit or investigation, as well as all subsequent observations and recommendations, are systematically submitted to the heads of the authorities or bodies concerned; they can only be made final after taking into account the responses received and, where appropriate, after hearing the views of the officials concerned.

Except for reports made at the request of parliament or the government, the publication of a report is necessarily preceded by the communication of the draft text that the Court proposes to publish to ministers and officials of the bodies concerned, as well as to other directly interested legal or natural persons. In the published report, their responses are presented in the annex to the Court's text.

Collegiality intervenes to conclude the main steps of the audit and publication procedures. All audits and investigations are entrusted to one or more rapporteurs. The investigation report, as well as subsequent draft observations and recommendations, provisional and final, are reviewed and discussed on a collegial basis by a group involving at least three judges. One of the judges acts as quality reviewer and ensures the quality of the audits.

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This audit, in a new format known as "flash", focuses on a current topic and a period under review of fifteen months. It prepares a comprehensive inventory of all public and private resources involved in public research from 1 January 2020 to 1 March 2021. The financial resources and procedures used to administer them are assessed. Having been the subject of an accelerated procedure, its investigation lasted four months, during which 13 notifications, with reference to Article L 111-3 of the CJF, were carried out as well as around thirty interviews. Brief questionnaires were sent to all relevant ministries, research organisations and funding institutions, French embassies in the United States, the United Kingdom, Germany, the Netherlands and Permanent Representation to the European Union. A specific questionnaire was sent to all universities. The response rate was 92%. Finally, 25 CHUs out of 32 were questioned through the Conference of CHU Directors General. The Court underlines the care taken by everyone in responding to these requests, allowing it to present a comprehensive and timely situation report. In order to adapt the deadlines to the circumstances, the right of reply period was reduced to two weeks.

The reliability of the proposed tallies calls for several methodological precautions:

- The sequence that leads from the establishment of appropriations to actual expenditure is not linear and raises the question of when a resource can be validly counted as such. As a result, the Court, because only these data are now available, has chosen, the delegation of appropriations as the operative event and not the implementation of the expenditure.
- The resources counted are mainly from public funds but also from private sources. The origin of the loans assigned or reassigned may be national or European. The Court therefore selected in its assessments all the resources allocated to French public research and earmarked as contributions to the fight against the pandemic.
- The payroll of researchers and teacher-researchers in the civil service who participated in the research effort is not taken into account. The funds used are mainly intervention funds.

Under these assumptions and conditions, the financing flows that may have escaped the analysis are, by their very nature, a cause of marginal error. The concept of "resources mobilised" here refers to all the funding brought together or collected to engage in research related to the pandemic, whether this represents resources redeployed within research organisations, public subsidies or private funding bodies. After making as comprehensive as possible an inventory of the funding, corrections were made to neutralise the risk of double counting. A summary table presents the aggregated and corrected data.

The draft report was deliberated on 10 June 2021 by the third chamber chaired by Mr. Louis Gautier, composed of Messrs. Tournier, Guibert, Mousson, Feller, Miller, Bouvard, Ms Delétang, Senior Counsellors, as well as, as rapporteurs, Mr. François Saint-Paul, Senior Counsellor on Extraordinary Service, Mr. Emmanuel Roux, Counsellor in Extraordinary Service, Ms. Béatrice Blondel, Temporary External Auditor, Mr. Patrick Netter, expert adviser, and, as quality reviewer, Mr. Philippe Rousselot, Senior Counsellor, President of division.

It was examined and approved on 17 June 2021 by the publication and planning committee of the Court of Accounts, composed of Mr. Moscovici, First President, Mrs Camby, General Rapporteur of the Committee, Messrs. Morin, Andréani, Terrien, Charpy and Gautier, Presidents of Chamber,Mr. Le Mer, President of division at the 2nd Chamber, Ms Hirsch, General prosecutor, whose opinions were noted.

EXECUTIVE SUMMARY

In the context of the health crisis, the Court decided to initiate an audit that, while respecting its professional standards, is noteworthy for the speed of its investigation. This work is presented as an initial assessment of the financial effort made to support public research in the fight against the pandemic.

The first part provides an inventory of the resources generated by the main funding bodies (departments, financing agencies, Europe) and the resources mobilised by the main operators, whether they are research institutions, universities or university hospital centres (CHU).

Over the period from January 2020 to March 2021, the total amount of resources put in place is around €502 million, or €530 million with European funds. This effort is less, in absolute terms and relatively, than that of other European countries with comparable scientific resources and infrastructure. The assessment carried out by the Court illustrates the plurality and heterogeneity of financing channels.

The second part puts this assessment into perspective. Despite the particularly meritorious efforts of all the stakeholders in the French research system, and despite the internationally recognised qualities of our researchers, the results do not meet expectations. The dispersal of initiatives, the difficulty in fine-tuning priorities, the unpreparedness to take risks and administrative burdens hindered the creation of a coherent and effective response system.

A research strategy in which every participant could recognise themselves in the place they occupied, was missing. In particular, the lack of a lead manager for the implementation was detrimental. In addition to assessments of the amounts of finance released in critical situations and observations on organisational flaws in times of crisis, the audit highlights structural flaws that need to be corrected.

The main findings of the survey

The total amount of resources allocated to French public research on COVID-19 amounts to €530.17 million, including European funds, or €502.48 million without these funds. This is a significant effort, but markedly lower than what was provided in Germany or the United Kingdom.

The Ministry of Higher Education, Research and Innovation (MESRI) and the Ministry of Solidarity and Health (MSS) have acted to fund calls for projects (CFPs), either directly or through funding agencies, such as the National Research Agency (ANR). In addition, the beneficiaries, whether they are research organisations, universities, University Hospitals (CHUs), have obtained, in varying but often significant proportions, European or private funding and used their own resources to finance the projects. The mobilisation of the various streams of funding was carried out through *ad hoc* processes in the short term (accelerated calls for projects, creation of an emergency fund, *top down* financing, mobilisation of internal resources).

The funding proved to be too dispersed to meet the challenges of the crisis, particularly in terms of vaccine research. The lack of organisation exacerbated this dispersal. Unlike other countries with a strong scientific tradition in biomedical matters, the overall strategy, oversight and structuring was insufficient. This situation was amplified by the absence of a leader recognised by all. The organisational efforts expected from the creation of the ANRS-MIE (ANRS | Infectious emerging diseases) took place late and without immediate resources. Finally, these exceptional financing efforts could not compensate for the funding shortfall prior to the crisis, particularly in the biology-health sector. The success and failures of the research are achieved over the long-term.

INTRODUCTION

This note, devoted to the financial resources mobilised for public research as part of the fight against the COVID-19 pandemic, results from a survey carried out in the particular context of the health crisis. It is inspired by the models chosen by other senior foreign supervisory institutions. It is noteworthy for having been carried out within a tight period of four months.

In the face of the global health crisis created by the COVID-19 pandemic, public research around the world found itself on the front line and under an urgent obligation to respond quickly and effectively. French research took part in this broad movement. The Court observed the full commitment of the scientific community, in all disciplines, not only in the life sciences field, but also computer science and in the humanities and social sciences. The scientific response covered all research segments, whether fundamental, translational[1] or clinical and at its various scales, administrations, research organisations, laboratories and researchers. It considered a large number of problems related to the virus, whether it was the search for its origins, its detection or its treatment, and also analysed all the collateral damage it was able to produce and the consequences it may have had.

This analysis covers a period from January 2020 to March 2021. It provides an initial review of funding for French public research as part of the fight against the pandemic and describes how these resources were mobilised in the emergency (first part)[2]. In addition to this review, it also seeks to understand the strategies governing their deployment, assess the management and coordination of the whole, and suggest initial conclusions (second part).

[1] Translational research (or transfer research) is located at the interface between fundamental laboratory research, which is used to understand fundamental biological mechanisms, and clinical research that is carried out directly with patients. The patient-oriented areas of this research are the development of innovative therapies and diagnostic techniques.

[2] The scope of the questioning has significantly exceeded that of the recent budget implementation note issued by the Court, which related only the budgetary appropriations for the interministerial research and higher education mission.

THE STATE OF FUNDING FOR PUBLIC RESEARCH IN THE FIGHT AGAINTS COVID 19

The Court estimates at €530.17 million, by integrating European funding (or €502.48 million for national funding alone), the total financial resources allocated to French public research as part of the fight against the pandemic.

1 NATIONAL FINANCING

1.1 Emergency budget appropriations

Three ministries mainly contributed to the funding of research during the health crisis (€121.8 million): the Ministry of Higher Education for Research and Innovation (MESRI) (€51.8 million) and the Ministry of Solidarity and Health (MSS) (€60.6 million) and, more marginally, the Ministry of Armed Forces (€9.47 million).

1.1.1 Funding from the Ministry of Higher Education and Research (MESRI)

As a central player during the period of the health crisis, MESRI, through its Directorate-General for Research and Innovation (DGRI), first unblocked in March 2020, €50 million from a freeze on the 172 programme, then an additional €1.8 million directly delegated at the end of the 2020 management period, for a total of €51.8 million (see Appendix 1, Table 1). The largest elements of the financing were paid in the form of additions to existing calls for projects (€16 million to the ANR , €1.2 million to the ANRS), in addition to the direct financing of certain projects, according to a variable and non-formalized process (€12.3 million), such as the detection of contamination *clusters* (€3 million for the deployment of the Obépine network, with the objective of conducting the research needed to deploy a virus surveillance network in wastewater) or understanding the epidemic and its health and social consequences (€5.1 million for EpiCov and SAPRIS). The DGRI also devoted €10.8 million to vaccine research projects (€5.5 million for three projects, €3 million for the development of the Covireivac platform for the coordination and monitoring of vaccine tests). These resources were able to take the form of co-financing with the MSS (€2.3 million to carry out comparative vaccine tests[3]), or with local authorities (€1 million for the Grand-Est Region, €1 million for the Hauts-de-France region). Finally, funding packages could be paid at the request of the ESRI Minister's office[4], without any form of call for projects. In addition, in March 2020, an enhanced coordination instrument between crisis management structures was established between the MESRI and the MSS. The objective of this interministerial unit was to monitor research involving human persons (MSS) and fundamental and pre-clinical research (MESRI). It was also responsible for implementing the *ad hoc* steering committee on therapeutic trials (CAPNET), aimed at prioritising Covid 19 therapeutic trials. It followed the work of the ANRS-

[3] MSS cofinancing also covered the Covireivac and Epicov projects.
[4] For example, €1 million on a project concerning the role of interferon in the immune response to COVID-19.

MIE (after the merger of ANRS and REACTing, see *below*) in order to supervise the production of vaccines[5]. MSS cofinancing also covered the Covireivac and Epicov projects.

1.1.2 Mobilisation of the Ministry of Solidarity and Health (MSS)

The MSS has rapidly introduced specific procedures to shorten the review periods for conducting calls for projects related to the study of COVID-19, mainly as part of the clinical research hospital (PHRC) programmes. Priorities were established through accelerated selection, entrusted to an *ad hoc* peer panel in two waves between March and June 2020. The first wave was intended to select priority projects for the treatment of the epidemic; the second was reserved for those falling within the priority areas established by the World Health Organisation (WHO). At the same time, it was possible to finance some projects that were not part of the CFP process but were of special interest to public health through the Ministry on an ongoing basis or by way of derogation, between March and April 2020, in agreement with REACTing.

An exceptional procedure, known as *fast track*[6]*,* was set up by the MSS, particularly for priority projects, to reduce the time limits for the opinions issued by the National Medicine and Health Product Safety Agency (ANSM) and by the Ethics Committee [Comité de protection des personnes], which is essential for the launch of clinical research projects. It removed the random selection intended to ensure impartiality of the opinions rendered that led to the involvement of practitioners on a volunteer basis[7].

The total amount of research funding by the MSS can be estimated at €60.6 million (see Appendix 1, Table 2). In terms of financing, €11.6 million[8] for projects deemed to be a priority outside CAPNET. The MSS also funded 30 CHUs carrying out research on COVID-19 through calls for projects (€49 million). The AP-HP benefited from a total of €24.3 million, or nearly 49% of funds granted through this channel. The Lyon civilian Hospices received a budget of €6.3 million, Bordeaux's CHU €5.1 million and the AP-HM. €1.9 million. The other 26 CHUs shared the remaining €12.5 million.

Projects labelled "national research priority" by CAPNET gave rise to a forecast commitment of €10 million by the MSS and €10 million by the MESRI in September 2020[9]. Since the end of this survey, the MSS and MESRI have indicated that €14 million and €8.5 million were committed and that an additional €52 million forecast has been recorded for financing these projects. These €52 million came from unblocking the €31 million from the programme 172 of the interministerial research and higher education mission (MIRES) and €21 million from the MSS through an increase in *teaching, research, reference and innovation (MERRI) missions.*

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[5] The duties of the unit were specified by the Prime Minister's office in April 2020 and expanded to take account of the evolution of the epidemic. The focus was particularly on vaccines, through monitoring the work of the Scientific Committee on vaccines and the Covireivac project and the coordination of research through CAPNET steering.

[6] *Fast track* – procedure to reduce review periods through a short decision-making cycle.

[7] The practice of random selection has been criticised by some researchers due to the lengthening of the processing times it incurs.

[8] Covireivac (a vaccine test platform for €4.2 million), COVICOMPARE tests conducted by the AP-HP, prior to the marketing of the Moderna and Pfizer vaccines, for €2.5 million and the EpiCov study, which measures the consequences of the health crisis on the population (€4.9 million).

[9] This amount was recorded at the informal interministerial meeting (RIM) on 29 September 2020.

It was noted that the Ministry of the Armed Forces stated that it had funded 34 projects selected as part of the call for projects launched by the Defence Innovation Agency (AID) in the field of research in the fight against the COVID-19 pandemic, for a total amount of €9.47 million.

1.2 Calls for projects from the National Research Agency (ANR)

The ANR contributed to the funding of research through three calls for projects (CFPs). Only the first two, whose publication ended before 1 March 2021, were taken into account in this audit. The first, Flash COVID-19, was launched reactively on 6 March 2020, a few weeks after the epidemic was declared an "international public health emergency" by the WHO. In 48 hours, the 44 projects considered most urgent by the Scientific Committee were each able to benefit from a seed budget of €30,000. For the others, an evaluation was carried out within two weeks. The second CFP, Research-Action COVID-19 (RA-COVID-19) was launched on 20 April 2020[10]. More generally,the 2021 ANR action plan has a general "COVID-19" priority across all of the 2021 generic call for projects (AAPG 2021).

Graphique n° 1 : "chronology of funding for calls for projects financed by the ANR during the health crisis"

Source:Court of Accounts based on ANR data

At the international level, the ANR, which was one of the agencies that quickly mobilised funds, decided to partner with European or foreign partners within the framework of existing CFPs, in order to avoid launching new bilateral or multilateral calls and lengthening deadlines. At the national level, the search for new partnerships during the health crisis has avoided a dispersion of resources and increased their impact. This approach is in line with the Court's recommendations made during previous audits[11].CFPs specific to COVID-19 have an average budget ranging from €114,000 and €153,000 per project, less than that granted on average to projects generally supported by the ANR (€357,400[12])[13]. On the other hand, the success rate,

[10] Note the existence of a last CFP initiated on 18 December 2020, Resilience COVID-19, ending on 2 March 2021, with a maximum budget of €80,000, the publication of which is scheduled for the second half of April 2021. It will cover new fields such as "the impact of COVID-19 on mental health" or "long covid".

[11] Report for integration to annual public report on the national research agency, 2010, p. 25.

[12] Activity report ANR 2019, p. 12.

[13] It should be noted that the CFPs specific to COVID-19 aim to support projects with a duration of between 12 and 18 months, while the average duration of projects usually supported by the ANR is 3 to 4 years.

particularly for the Flash COVID-19 CFP (41%), is higher than for other ANR projects, which is 18%[14] on average[15].

Table n° 1 : resources distributed by the ANR as part of COVID-19 calls for projects

CFP COVID-19	Selected projects	Amount (€ million)	Success rate	Average budget in thousands of €
Flash COVID-19	106*	€17.6 million	40.9%	153
RA-COVID-19 (2020-2021)	128	€14.6 million	20.7%	114
Total	**234**	**€32.2 million**		

Source: Court of Accounts based on ANR data (: of which 9 were started and not taken into account)*

The coordination of strategic financing priorities strengthened during the health crisis. Flash COVID-19 and RA-COVID-19 calls were drawn up on the basis of WHO recommendations and then approved by an *ad hoc* scientific steering committee within the ANR, in conjunction with the MESRI and REACTing in order to define a common financing strategy. Clinical research, funded by the MSS, and the development of vaccines, given the importance of the funding they require and the scope of intervention of the ANR, were excluded from the scope of these CFPs.

For reasons relating to the specific characteristics of certain co-funders and speed of appropriation of funds, all co-financing (regions, Fondation de France, Fondation pour la Recherche Médicale) were not managed by the ANR but some was made directly to laboratory supervisors without passing through the ANR. They have also sometimes given rise to the provision of funds without waiting for formalisation through an agreement or accelerated agreement. However, this procedure used on an exceptional basis did not go beyond the traditional mode of project selection and evaluation, in order to avoid any breach of equality between applicants. The researchers interviewed by the Court confirmed this rapid provision of resources for most of them.

Table n° 2 : source of financing used by the ANR

MESRI	ANR (intervention budget)	Fondation pour la Recherche Médicale	Fondation de France	Regions	Total amount (€ million)
€16 million	€6.4 million	€4.7 million	€3 million	€2.1 million	€32.2 million

Source: Court of Accounts based on ANR data

[14] Analysis note on the budget implementation of the Research and Higher Education Mission (MIRES) 2020.
[15] Activity report ANR 2019, p. 12.

1.3 The Future Investment Programme

As part of the 3rd "Future Investment" Programme, with funding of €10 billion, budget programme 423 *Acceleration and modernisation of companies* was used to the extent of €249 million. Based on information provided by the General Secretary for Investment(SGPI) in the context of the right of reply, without further details, however, this amount almost doubled and would amount to €528.3 million at 31 May 2021.

As part of the "Structuring research and development projects for competitiveness" initiative of PIA3, operated by Bpifrance, a call for projects "Structuring Projects for Competitiveness (PSPC) COVID-19 special" was launched at the end of March 2020, in order to support companies and public partners that offer therapeutic solutions against COVID-19, by financing clinical trials on French soil, to the extent of €50 million per project. As of 1 June 2021, Bpifrance counts seven projects, representing €84 million in aid for covid R&D. In addition, the "Support and transformation of sectoral linkages" initiative, also implemented by Bpifrance, includes a call for expressions of interest (AMI) intended to identify and support innovative projects, whose potential is based on the development of new French manufacturing and production capacities for drugs involved in treating patients with COVID-19. As of this date, 18 projects were selected for a total of €165 million[16].

The ANR, also operating the Future Investment Programme (PIA)[17], did not initiate a call for specific "COVID-19" projects in this function, the CFPs mentioned above being those provided for under the supervision of the MESRI. However, many ongoing projects managed by this operator, funded by the investment programme of the future, have reoriented their research activities to combat the COVID-19 pandemic by mobilising funding previously obtained from the ANR *via* Flash calls. This is the case, for example, for F-CRIN the National Platform for Clinical Research Infrastructures funded by PIA 1, which participated in research on COVID-19 via its network, or IHU-Méditerranée Infection, which is dedicated to the fight against infectious diseases. This financing, already taken into account in the amounts mobilised by the ANR for Flash COVID-19 calls, is not included in the table below. The same applies to the interests of the non-consumable endowments that finance these structures of excellence.

Table n° 3 : PIA research funding during the health crisis

Types of projects funded	Amount (€ million)
Special COVID-19 PSPC	€84 million
AMI "Capacity Building"	€165 million
Total	**€249 million**

Source: Court of Accounts based on Bpifrance data

[16] This is the amount of aid granted to the projects supported during this period and differs from the total project base.

[17] The Future Investment Programme (PIA), led by the General Secretary for Investment (SGPI), has been put in place by the State to finance innovative and promising investments in the region, in order to enable France to enhance its growth and employment potential. It is broken down into 4 successive waves, which correspond to the commitment of new funds to continue the deployment of innovation and growth potential in France (2010: PIA 1: €35 billion; 2014: PIA 2: €12 billion; 2017: PIA 3: €10 billion; 2020: PIA 4: €20 billion, including €11 billion included in the French recovery plan).

1.4 Redeployment of resources by research organisations

1.4.1 Funding effort mainly provided by the National Centre for Scientific Research (CNRS) and Inserm

Inserm, drawing on the REACTing consortium[18], which it coordinates, and assisted by the AVIESAN Alliance, which it chairs, guaranteed the funding of research projects and defined a strategy in conjunction with the ANR and the interministerial unit MSS/MESRI.

Although REACTing participated in the selection and funding of research projects considered to be high-priority, Inserm was also able to benefit from funding, through the success of CFPs of the ANR, the MSS and the European Union, or its Joint Research Units (UMRs).

The financing of projects via REACTing was supported by MESRI's emergency fund loans mobilizing a budget of €1.7 million to provide financing in full or in the form of seeding. Within this framework, 20 projects were financed[19]. In addition, nearly €14 million from this fund was allocated for Covireivac projects (€5.3 million), EpiCov, SAPRIS (€4.5 million) and the Covid-South CFP (€1.2 million). Other partners (regions, AFD) as well as private partners, such as the Medical Research Foundation, have also allocated funding within this framework. Finally, it should be remembered that Inserm teams have obtained funding in the context of calls for projects from the ANR or the European Union.

In total, Inserm believes that it has mobilised €55.7 million for research carried out in the context of the health crisis. This amount includes both the financing received by Inserm as part of its financing missions, through REACTing, as well as what was received as part of the RNA's calls for projects by its UMRs and the amounts mobilised for the extension of doctoral contracts. However, it does not include the payroll of its research staff.

More specifically, this amount is €31.1 million, excluding the financing of the ANR, AFD, budgetary appropriations, already recorded in other sections of this audit and doctoral contracts excluded from this study (see *below*, summary table)

Table n° 4 : financing committed by Inserm to research during the health crisis period (in € million)

Type of financing	Amount (€ million)
Public financing	€30.4 million
Private financing	€2.9 million
European financing	€22.4 million
Total	**€55.7 million**

Source: Court of Accounts based on Inserm data

[18] The REACTing consortium is a multidisciplinary consortium bringing together teams and laboratories of excellence, in order to prepare and coordinate research to address health crises related to emerging infectious diseases.

[19] Since all of these funds were not consumed for project financing, a reorientation aimed at supplementing the 2021 operating budget for the ANRS-MIE agency was carried out for €978,000.

In addition to this funding mission, Inserm, via REACTing then the ANRS-MIE, plays an important role in defining priority research areas within CAPNET, of which it is a member. Inserm also participates in the development of European clinical trials, such as *Discovery*[20], in treatments through the implementation of cohorts for SAPRIS and EpiCov projects, in the development of vaccines through its links with the COVID-19 Vaccines Committee, and in the coordination of the Covireivac platform, which is responsible for organising vaccine trials throughout the country.

In addition, the former National AIDS and Hepatitis Research Agency (ANRS), an autonomous agency of Inserm, also mobilised itself and, drawing on its network and experience in the fight against AIDS, launched a first "flash" call for tenders on 1 April 2020, to fund research projects for countries in the Southern hemisphere (West Africa and South East Asia). This call for projects was supported by €1 million from the Ministry of Europe and Foreign Affairs, €1.2 million from MESRI's "Covid-South" emergency fund and €4 million deducted from the ANRS budget. In proportion to the amount allocated to other calls for projects at national level, in particular by the ANR, this effort is significant. Without questioning the merits of this initiative, however, it raises questions about the consistency, definition and coordination of tenders at the national level.

In January 2021, following a process planned in April 2020, 9 months earlier, by the stakeholders concerned and the Analysis, Research and Expertise Committee (CARE), REACTing and the ANRS came together to form a new agency, the ANRS | Emerging infectious diseases (ANRS-MIE). This agency has its own resources previously allocated to the ANRS to fund research on HIV and REACTing. As of the date of this audit, this new agency had not received any additional appropriations and therefore relies on the budget initially allocated to the ANRS and mainly dedicated to HIV research[21] (€4 million) and REACTing/Inserm (€39.8 million in subsidies for public service costs) and additional and exceptional resources to ensure its operation in an indefinite manner.

In the coming months, the increase in the ANRS-MIE budget will be a major issue in the fight against the pandemic. A priority research equipment project (PEPR) "Emerging Infectious Diseases" within PIA 4, amounting to €80 million over 3 to 5 years, has been approved and will be accompanied by a reflection on how it is managed by the ANRS-MIE. Other funding is under discussion but is still awaiting confirmation on several points. Such prospects, if fulfilled, should help strengthen the ANRS-MIE in the execution of its mission.

Like the ANR, Inserm has adapted its procedures to enable a faster project launches by making cash advances without waiting for the finalisation of the agreements between the project sponsors of the ANR or the European Union. In parallel to this procedure, some projects were placed into a state of dormancy, these being subject to extension amendments. Inserm, however, notes the need to provide a funding channel for EPSTs (public scientific and technological institutions), carrying out research on human health, but which are not healthcare organisations, for the benefit of the PHRCs without having to enter into an emergency agreement with the CHUs (which requires a decision from the MSS beforehand, then a

[20] Launched in March 2020 under the auspices of the WHO's Global Solidarity clinical trials, *Discovery* is a clinical trial of efficacy and tolerance. This is the only large-scale European academic trial on COVID-19 treatments (source: Inserm website).

[21] The Aides and Sidaction associations claimed €76 million in state subsidies in 2021, or €36.2 million more than the ANRS budget for AIDS and hepatitis research, at the launch of ANRS-MIE (AEF, dispatch no. 642420). Professor Barré-Sinoussi, then Chair of the CARE Committee, also recalled the need to provide satisfactory support to the new agency that had been created (hearing before the Senate Social Affairs Committee on 7 May 2000).

payment to the ARS), as was the case for the Lyon CHU (for the *Discovery* trial) and the Bordeaux CHU.

The CNRS, taking advantage of its multi-disciplinary nature, intervened on various research themes: building models to monitor the evolution of the pandemic (for example, through the analysis of wastewater – Obépine project); implementation of decision support tools; coordination of studies, mainly in the humanities and social sciences (SHS), related to the social, political and economic impacts of the crisis (effects of lockdown on the mental health of populations, or on the phenomena of discrimination) or in the economic or legal field (for example, studies of organisational factors in crisis management, the adaptation of the law, or the resulting major economic upheavals at the global level).

In terms of organisation, the CNRS relied on "G5 research", composed by the chairmen of the CNRS, Inserm, INRAE, INRIA and the CEA. It also approached alliances such as ATHENA (SHS), AVIESAN (Life and Health Sciences) and AllENvi (environmental research), in order to create a number of common initiatives and avoid redundancy.

In terms of funding, there were many contributions. The ANR thus allocated €3.7 million to CNRS project sponsors as part of its COVID-19[22] calls for tenders. The CNRS has benefited from €2.7 million from the MESRI to set up platforms and programmes, in the management of several of its institutes, which constitute investments for possible future epidemics. The CNRS has finally committed financing from its own resources, which have been spread across several institutions, for a total of €360,000 in addition to the usual laboratory allocations. Part of this has been redeployed as a result of savings in other areas of activity, particularly expenses related to missions and conferences.

In total, the CNRS mobilised €9 million during the health crisis.

Table n° 5 : CNRS research funding during the health crisis

Type of financing	Amount (€ million)
ANR	€3.7 million
MESRI	€2.7 million
Own resources	€0.36 million
External financing	€2.3 million
Total	**€9 million**

Source: Court of Accounts based on CNRS data

[22] For the ANRS-2020-COVID-19 SOUTH CFP: 1 INSB (UMR5308), 2 INEE projects (CNRS 5290), 2 INSHS projects (UMR8007, UMR5151).

1.4.2 Financing provided by Pasteur Institutes in Paris and Lille

The two Pasteur Institutes were particularly active during the health crisis. The Pasteur Institute Paris has, in part, focused its efforts on vaccine research[23], while Lille has been involved in the search for therapeutic drugs.

At the Pasteur Institute Paris, an action and research group composed of experts from multiple disciplines was set up in January 2020. This action group coordinated the engagement of more than sixty teams and at least 450 people directly involved in several areas of research, including knowledge of the virus, research into therapeutic strategies and vaccine development. It also launched calls for projects so that research work can align the major priorities of the fight against the pandemic with the expertise of the research teams at the Pasteur Institute Paris. However, as this group remains internal, the Institute acknowledges that it is necessary to consider the construction of an epidemic preparedness structure, particularly in relation to the ANRS-MIE.

The essential contribution of the CNR of respiratory infections viruses at the Pasteur Institute Paris

The National Reference Centre (CNR) of respiratory infections viruses of the Pasteur Institute Paris played a decisive role in the response to the COVID-19 crisis. In particular, it allowed the first complete sequencing of the SARS-CoV 2 genome in Europe, from 29 January 2020, as well as the development of the first diagnostic tests (RT-PCR) and serological tests used today by hospitals and laboratories throughout France. In addition, the CNR is one of the leading large-scale genomic monitoring stakeholders in relation to SARS-CoV-2, enabling identification of the emergence and development of new variants, as part of the EMERGEN project led by SPF and the ANRS-MIE.

Out of total operating expenses of €307 million in 2020, the Pasteur Institute Paris has devoted significant resources to the fight against the COVID-19 pandemic, committing more than €12 million in internal financing, out of a total of more than €30 million.

[23] Other research by the Pasteur Institute Paris also focused on the development of new diagnostic and serological tools, epidemiology and modelling to set up monitoring of the epidemic, and the search for therapeutic strategies.

Table n° 6 : research funding from the Pasteur Institute Paris during the health crisis

Type of financing	Amount in € million
Public financing	€5.7 million
Donations and patronage	€8.1 million
Own resources	€12.1 million
Other financing	€4.3 million
Total	**€30.2 million**

Source: Court of Accounts based on Pasteur Institute Paris data

A different approach was observed from the Pasteur Institute Lille. Under the same functional and scientific direction, the work carried out brought together medicinal chemists, microbiologists, virologists, structural biologists and clinicians representing all the expertise required for the rapid identification of therapeutic solutions needed to manage diseases caused by emerging pathogens. The Pasteur campus in Lille, which brings together the Pasteur Institute Lille, the University of Lille, Inserm and CNRS, is, due to its specific features, an especially propitious place for developing such a centre specialising in innovative treatments against emerging infectious diseases. Joint work focused on identifying an effective molecule against COVID-19 among drugs used for other pathologies with an antiviral activity[24]. The Institute was strongly supported by the private sector, with the LVMH Group giving it €5 million in October 2020 to finance its research. This funding alone represents a large part of the amounts committed by the Institute during the period under review.

Table n° 7 : research funding from the Pasteur Institute Lille during the health crisis

Type of financing	Amount (€ million)
Public financing	€2.1 million
Own resources	€0.02 million
Private financing	€5.8 million
Total	**€7.9 million**

Source: Court of Accounts based on Pasteur Institute Lille data

1.4.3 Other financing: the AFD and CEA

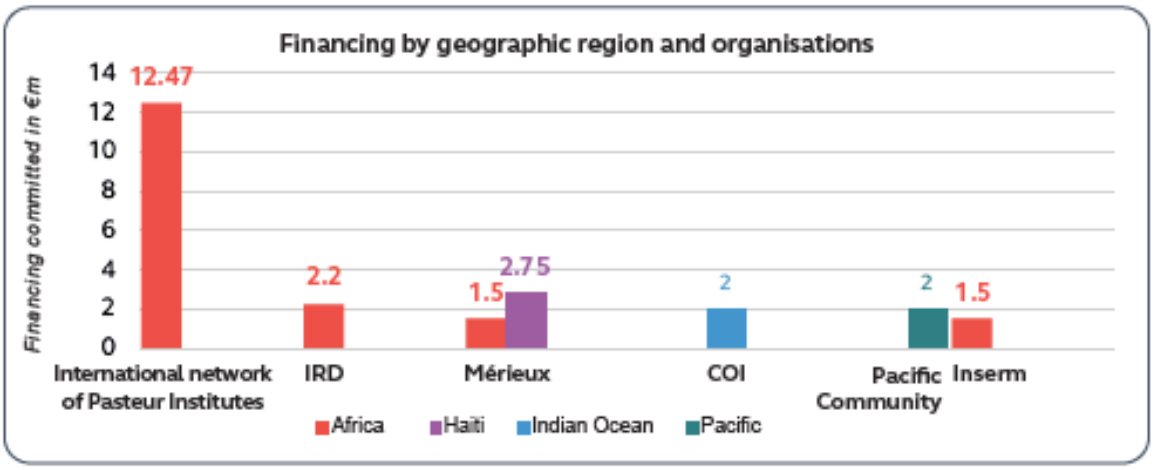
These two operators played a significant role in research funding during the health crisis.

1. The French Development Agency (AFD) Group is a public institution that implements France's development and international solidarity policy. It contributed €24.4 million to support developing countries in the context of the COVID-19 crisis, mainly in the African continent (€15.67 million), this being is 64% of the amount committed, far ahead of

[24] In addition to these research activities, the Pasteur Institute Lille has also been active in providing healthcare by making all of its health staff, doctors and nurses available to the ARS, as well as the premises of its prevention centre. In addition, the Institute worked, in partnership with the Synlab Biology Laboratory located on the campus, to set up a "corona drive" which enabled a large number of COVID-19 tests to be carried out very quickly.

Asia, the Pacific Ocean and the Indian Ocean, which represent 8.19% and Haiti 11.26%. The aim of this funding was to support actions carried out by the AFD's health and research partners, such as Inserm (operational response to COVID-19 in French-speaking Africa, APHRO-COV), the International Network of Pasteur Institutes (reference laboratory mandates), the IRD (ARIACOV project in Africa) [25] or the Indian Ocean Commission (IOC).

Graphique n° 2 : distribution of the AFD's research funding during the health crisis



Source: Court of Accounts based on AFD data

2. The French Atomic Energy and Alternative Energy Commission (CEA) quickly got involved in research activities during the health crisis.

Excluding financing obtained as part of the Flash COVID-19 and RA-COVID-19 CFP of the ANR and the funds granted by the University of Paris Saclay already recorded in other developments, the amount of funding allocated by the CEA to research during the health crisis amounted to €5.34 million. However, although only two CEA projects were financed by European funds (H2020), the amount involved remains higher than the public funds committed.

Table n° 8 : the CEA's research funding during the health crisis

Type of financing	Amount (€ million)
Public financing	€2.24 million
Private financing	€0.6 million
European financing	€2.5 million
Total	**€5.34 million**

Source: Court of Accounts based on CEA data

[25] On the work carried out by the IRD in the context of the health crisis, see Court of Accounts, 2021 annual public report, "The IRD - indispensable strategic choices".

An illustration of the complementarity of financing

In mid-March, some of the CEA-DRF teams were selected by REACTing's scientific committee to develop an experimental model of SARS-CoV-2 infection in non-human primates for preclinical research on preventive or therapeutic approaches, which received funding of €40,000. This project also received funding from the ANR, as well as European funding. This model was used to carry out one of the preclinical studies led by the national biology and health infrastructure IDMIT (CEA-DRF) which demonstrated that hydroxychloroquine had no antiviral effect on COVID-19. The study carried out was published in *Nature* magazine in record time. Although the scattering of COVID-19 research funding is frequently highlighted, this example illustrates the need to combine several sources of funding to obtain publications in prestigious journals.

2 LOCAL INITIATIVES LED BY UNIVERSITIES AND CHUS

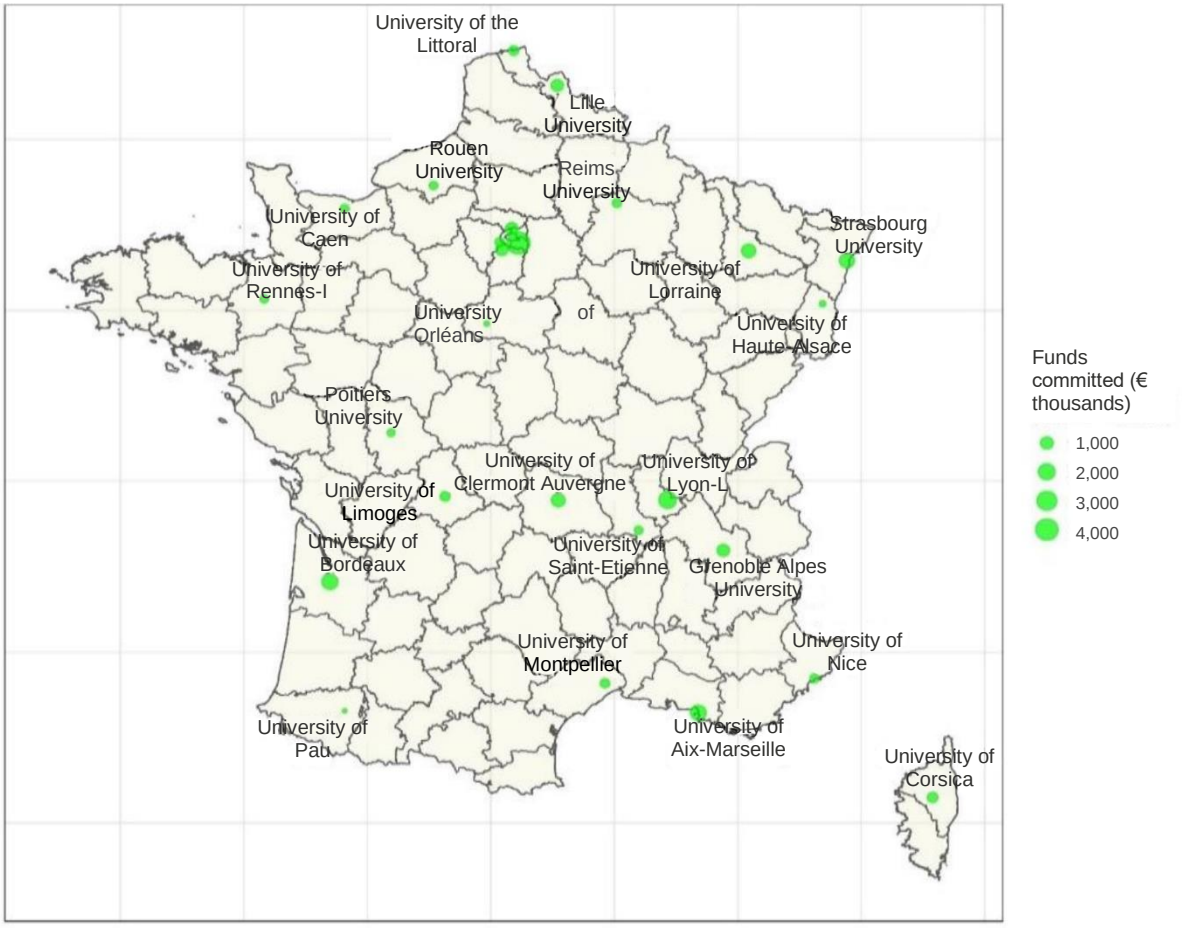
2.1 A significant participation of universities in the research effort

The survey mapped the financial efforts of universities that invested in research into COVID-19. Many institutions were involved, varying in size. They were supported by the ANR, whose cumulative payments amounted to €8.5 million, or 24% of the total funding allocated by universities as a whole into research undertaken in the context of the health crisis.

Several universities undertook research from their own resources for an amount exceeding €3 million, by mobilising, where appropriate, IDEX or I-site funds when the institution had them (for a total of €1.6 million). Local governments played an active role in providing finance, particularly the regions, which are very much involved, and often significantly so, in the financing mechanism, amounting to €5.3 million in total. Some universities particularly benefited from this (Clermont Auvergne, €863,580; Bordeaux, €739,350; Lorraine, €595,985; Limoges, €589,125; Corsica, €344,000).

Conversely, there are few traces of European loans, which are often more difficult to mobilise over short deadlines and have complex award procedures (cumulative amount of €2.4 million). On the other hand, universities received support from the private sector: companies provided financing of close to €2.8 million and sponsorship initiatives of more than €490,000 were declared. Academic or partnership foundations were sometimes approached with requests for funding, totalling close to €550,000, when their activity lent itself to this. However, academic research remains largely supported by public funding, to the extent of 86%.

Carte n° 1 : Distribution of the main funding allocated by universities to research in the context of the health crisis



Source: Court of Accounts based on data collected from universities

Regardless of their area of focus, universities have demonstrated a high degree of responsiveness and an often pragmatic attitude to conducting research aimed at solving practical problems. This made it possible to establish partnerships with companies to create protective visors (University of Nantes) or hydro-alcoholic solutions (University of Orléans). While financial support for biomedical research accounts for the majority (57%, mainly driven by universities with strong research capacity[26]), it should be noted that 43% of funding has been directed into the humanities and social sciences sector. In this area, the work focused, for example, on the psychological effects of the health crisis and the peripheral behaviours it imposed: the problem of hand washing, the effects of the epidemic and lockdown on the mourning of a close relative (University of Strasbourg), characterization of the effects of the lockdown on sleep and physical activity (University of Grenoble) and the consequences of remote working (Clermont-Ferrand University). Several legal studies (the issue of domestic violence, the possible legal causes behind the lateness of French laboratories in producing a

[26] Where Aix-Marseille University, Sorbonne University, Claude Bernard Lyon-I University, Côte d'Azur University, Bordeaux University, Paris University, Strasbourg University, Grenoble Alpes University and Paris-Saclay University are mainly found.

vaccine at the University of Paris 2) and studies in the economic and management sciences (for example, studying the economic impact of the crisis, particularly on the default rate of companies at the University of Paris-Dauphine) were also undertaken.

In the end, the total funding by universities (more than €35 million) shows that they were able to fulfil their role as research operators, like the national bodies and often in contact with them through their UMRs (see Appendix 1, Table 4)

Table n° 9 : research funding from French universities during the health crisis

Type of financing	Amount (€ million)
Public financing	€25.2 million
Private financing	€3.9 million
Own resources	€6.1 million
Total	**€35.2 million**

Source: Court of Accounts based on data collected from universities

2.2 Clinical research conducted by the CHUs

The University Hospitals (CHUs) have played a central role in the fight against the pandemic. The organisations established, which the Court was able to study through data from a census carried out by 25 of the 32 existing institutions[27], showed that they played a leading role in clinical research, in connection with translational[28] and fundamental research, seeking to develop or strengthen their links with universities, research organisations or industry.

Major clinical research studies have been conducted on a regional or even national scale to include as many patients as possible (trials conducted for priority studies, such as *Discovery* or French Covid). In addition, the CHUs responded to the many CFPs related to therapeutic trials, which included assessing different strategies, understanding the mechanisms of the virus and disease, and identifying risk factors among vulnerable populations[29]. They also developed, on their own initiative, related projects to explore all aspects of the pathology, including care and organisation. Complementary to national projects,

[27] List of 25 CHUs concerned: CHU Amiens-Picardie, CHU Angers, CHU Bordeaux, CHRU Brest, CHU Caen, CHU Dijon, CHU Grenoble, CHU La Réunion, CHU Lille, CHU Limoges, AP-HM, CHU de Martinique, CHU Montpellier, CHU Nancy, CHU Nantes, CHU Nice, CHU Nîmes, AP-HP, CHU Poitiers, CHU Rennes, CHU Rouen, CHU Saint-Etienne, CHU Strasbourg, CHU Toulouse, CHU Tours.

[28] Translational research (or transfer research) is located at the interface between fundamental laboratory research, which is used to understand fundamental biological mechanisms, and clinical research that is carried out directly with patients. The patient-oriented areas of this research are the development of innovative therapies and diagnostic techniques.

[29] Between 2020 and 2021, the CHUs facilitated 73 category 1 research studies involving the human person (RIPH): 37 are in progress at the date of this audit (in the process of inclusion, monitoring or analysis), 16 have been stopped or suspended, 11 are completed and 9 are in the process of being launched or awaiting regulatory approvals. (source: *CHU's Conference of Directors General*, April 2021).

these projects have integrated research projects in epidemiology, prognosis, diagnostic, clinical and therapeutic research, and projects in the humanities and social sciences (for example, on the evaluation of psychological and ethical assistance mechanisms for resuscitation caregivers, or on the early return home for non-Covid patients). The hospital-university teams finally distinguished themselves by developing alternative uses for certain innovations in crisis situations (personal protective equipment, medical equipment, etc.).

The external funding streams received by the 25 CHUs to finance their research have been numerous and varied (see Appendix 1, Table 3). Half of them emanated from the MSS (more than €32 million[30]). The rest comes from national agencies and operators (ANR, Bpifrance, innovation agency of La Défense) and regional health agencies. We also note the participation of local authorities (towns, cities, departments and regions) to the extent of €2.7 million, that of IDEX or I-SITE supported by universities (€2 million), and the major financing of industrial and sponsor partners (€8 million). The CHUs finally carried out certain projects from own resources, amounting to €4.5 million.

In the end, the CHUs mobilised nearly €60 million, which positions them well above universities (nearly €35 million) and made them significant players at the national level.

Table n° 10 : distribution of CHU funding for research during the health crisis

Type of financing	Amount (€ million)
Public financing	€49.8 million
Private financing	€9.6 million
European financing	€0.3 million
Total	**€59.66 million**

Source: Court of Accounts based on data collected by the CHU Directors' Conference

3 SUMMARY OF FINANCING MOBILISED

The total amount of financing mobilised in the context of the health crisis has been established at €530.17 million with European funds, and €502.48 million with national resources alone. The table below presents both results. Compared to the previous tables, corrections neutralised the double counting. This operation can be performed easily for funding from the ministries (€121 million) and funding from finance agencies (€289 million). On the other hand, there remains a marginal risk of error for institutions, due in particular to mixed research units whose cross-funding is sometimes difficult to unwind.

[30] For all CHUs, the amount of CFPs financed by the DGOS stands at €49 million.

Table n° 11 : overall distribution of research funding during the health crisis period

Funders	Amount in € millions including European financing	Amount in € millions excluding European financing
Appropriations from ministries		
MESRI	51.8	51.8
MSS	60.6	60.6
MINARM	9.47	9.47
Total	121.87	121.87
Funds mobilised for financing agencies		
ANR (Flash COVID-19 and RA-COVID-19) excluding MESRI emergency fund	16	16
Future Investments Program -PIA3 (SGPI/ Prime Minister)	249	249
AFD	24.4	24.4
Total	289.4	289.4
Appropriations mobilised by research organisations and universities		
Inserm (excluding MESRI, MSS, ANR and AFD)	31.1	8.7
CNRS (excluding ANR and MESRI)	2.6	2.6
CEA (excluding MESRI, MSS, MINARM, ANR and universities)	4.27	1.77
Pasteur Institute Lille (excluding public financing)	5.8	5.8
Pasteur Institute Paris (excluding public financing)	24.5	24.5
Universities (excluding ANR, MESRI and MSS)	26.23	23.74
CHU (excluding PHRC and ANR)	24.4	24.1
Total	118.9	91.21
Grand total	**530.17**	**502.48**

Source: Court of Accounts

4 SOME ELEMENTS OF INTERNATIONAL COMPARISON

Comparisons are not easy due to differences in structuring research and differences in budget presentation. In a pragmatic fashion, the Court has sought to establish orders of magnitude for 2020 that are as reliable and comparable as possible for the amounts involved, in particular by excluding costs related to care and the purchase of vaccine doses, as well as staff payroll. Despite these precautions, these assessments may also be subject to methodological biases, in particular when taking into account or including, more or less exhaustively, remuneration and welfare costs. Appendix 2 outlines how these assessments, which relate to public funding, have been constructed.

In 2020, **Germany** committed a total of €1.5 billion in public funding to support research. It had major advantages, first of all its biotech companies[31], the first in Europe for expertise in mRNA vaccines (BioNtech, and Curevac under testing). Germany has resolutely protected the research effort of its biotech companies (injection of €1 billion) against the risks of takeover from outside Europe.

A strong prioritisation of clinical trials, through a network which all university hospitals joined and cooperate with, was set up immediately. One of the strengths of this network was the speed of its launch (national task force, data exchange platform, selection of 13 priority research projects)[32]. On average, 20 university hospitals cooperate on a project. Most clinicians are involved in these projects carried out within hospitals and report experiences and new findings through the data exchange platform. The project enjoys broad acceptance within German university hospitals. For the year 2021, in addition to the extension of funding (€50 million), the Ministry of Research added €240 million for collaborative development from 2022 to 2024. The level of public funding for research also allows heavy concentrations on five research institutes.

In 2020, the **United States** committed a volume of funds for research on COVID-19 of $11.6 billion, or €9.63 billion. After the 2001 attacks and the use of the Anthrax, the United States created the agency BARDA (*Biological Advanced Research and Development Authority),* a federal agency responsible for supporting the development of medical countermeasures that the government considers necessary. Administratively, the *BARDA* is an agency of the *Health and Human Services Department (HHS,* the Ministry of Health and Social Affairs) in the Office of the *Assistant Secretary for Preparedness and Response (ASPR,* Deputy Minister for Preparation and Response) who has also managed the *Strategic National Stockpile* since 2018. The objective is 1) to advise the Secretary (*US HHS);* 2) oversee the research and advanced development of appropriate countermeasures; 3) maintain the national strategic stock and 4) provide logistical support for the federal response to public health emergencies. The law "re-authorised" the Agency in 2013 and, with more difficulty, in 2018, parliamentarians and industrialists at the time doubting the commitment of the US administration to continuing its action effectively. The *21st Century Cure Act* adopted at the end of 2016 gives the *BARDA* the opportunity to form public-private partnerships. Its *Division of Research, Innovation and Venture* must leverage the new authorisations granted to stimulate innovation through two forms of financing: one dilutive (which impacts the structure of shareholders, that is, the company's capital), the other non-dilutive (which retains current shareholders, and takes the form of bonds or loans). The idea is to build an innovation ecosystem, led by industry and entrepreneurs, to address the country's major health threats. In recent years, the budgets allocated were $1.02 billion (2018), $1.27 billion (2019), $1.6 billion (2020) and the request for 2021 is $1.4 billion. The portfolio of projects supported by the *BARDA* against COVID-19 is regularly updated[33].

The COVID-19 crisis was an opportunity to develop a new public-private partnership model to allow the public sector to take part of the risk that the private sector could not pre-finance (*to de-risk*). This is mainly the risk associated with the development of vaccine

[31] According to the OECD, biotechnologies or "biotechs" are the application of science and technology to living organisms, as well as its components, products and modelling, to modify living or non-living materials for the production of knowledge, goods and services. Biotech companies rely on this scientific research and technology to develop solutions.

[32] For the list of 13 themes: *https://www.netzwerk-universitaetsmedizin.de.* In normal times, negotiations between the government and the *Länder* take longer.

[33] *https://www.medicalcountermeasures.gov/app/barda/coronavirus/COVID19.aspx*

candidates, which is only detected at the time of clinical trials. To make this administrative centre competitive, it has been equipped with financial resources capable of strengthening the prioritisation of clinical trials. It is the public-private ensemble that is financed generally.

The **Netherlands** has committed around €360 million, but by allocating a significant portion of this investment in international cooperation, which calls for some clarification. The Dutch contribution includes a €192 million stake in the multilateral alliance *Access to COVID-19 Tools* (ACT). ACT is an alliance that includes the WHO, the Coalition for Innovations in Epidemic Preparation (CEPI), the Global Alliance for Vaccines (GAVI), the Global Fund Against AIDS, Malaria and Tuberculosis, the Bill and Melinda Gates Foundation, etc. This set includes four areas of action: diagnostics, therapeutic products, vaccines (COVAX dose purchase financing), strengthening of health systems. This alliance is therefore not only research-oriented, but has much broader objectives. If we do not take this contribution into account, but we do, on the other hand, include the Dutch contribution to the CEPI Coalition, which focuses particularly on research, including clinical research, this gives a Dutch commitment to research of at least €165 million. The Netherlands contributed €50 million to the CEPI, which is a very substantial commitment to research through the multilateral channel.

In the **United Kingdom**, total research funding (including the preparation of future production centres) is approximately £1.12 billion, or €1.3 billion. The UK has suitable steering structures. This is the case with the UKRI (*United Kingdom Research Innovation*), created in 2017-2018, which brings together all the funding bodies involved in the field (the board brings together the universities, charities, industry, etc.). The creation of the UK Vaccine Taskforce should be noted. It was headed in 2020 by an experienced figure from venture capital background in the biotechnology sector. It is also necessary to add a very strong prioritisation of clinical trials (*Recovery*) accepted by all stakeholders, and, furthermore, the excellence of the academic laboratories of the golden triangle (Oxford, Cambridge, Imperial College) at the cutting edge of research, including fundamental research (£130 million injected in 2020). This ecosystem appears to be well suited to risk-taking.

The European Union has committed €4.4 billion to support the pandemic research effort. With no equivalent of the U.S. BARDA agency, the EU had to create a new tool in order to switch to a risk-taking economic model: the conclusion of anticipated purchase contracts by the Commission with the manufacturer, before marketing authorisation from the European Medicines Agency, all financed by the emergency aid instrument of the European budget, making it possible to reserve subsequent purchase by the Member States. This shift, in which France was heavily involved, was essential to improve the performance of European research, that is to say, for European citizens to have access to therapeutic products resulting from this research and therefore for this European research to not be used only to pave the way for the success of other ecosystems, admittedly with solidarity but generally competing. To the standard element of the calls for research projects, funded by Horizon 2020, a second stage was added (*ERA vs. Corona* plan) allowing the injection of funding into biotechs (InnovFin, IMI2, the pilot phase of the EIC).

The most significant innovation was the use of the emergency aid instrument, which, on the *American* BARDA model but without fulfilling all of its functions, is the administrative centre of European public risk-taking. The European Union mobilised within a few weeks, without having the early advantage of the United States, for example, which founded the BARDA Agency in 2006. However, the experiment remains fragile and needs to be consolidated and expanded (European Health Emergency Preparedness and Response Authority project *HERA)*.

Table n° 12 : international comparison of the distribution of public research funding in the COVID-19 crisis

Country	Amount in €billion
Germany	1.5 billion
United States[34]	9.63 billion
Netherlands	0.16 billion
United Kingdom[35]	1.30 billion
European Union	4.4 billion

Source: Embassies of France in Washington, London, Berlin, The Hague, PREU.

[34] Exchange rates as at 4 May 2021: 1.2044 (Bank of France).
[35] Exchange rates as at 4 May 2021: 1.1556 (Bank of France).

AN INITIAL REVIEW OF RESEARCH FUNDING AS PART OF THE FIGHT AGAINST COVID 19

The scientific community was strongly mobilised during the crisis period. However, this large-scale response should not mask a set of systemic difficulties that most often derive their origin from the organisation and operation of French research in the biomedical and biotechnology field.

1. SCATTERING OF INITIATIVES

The considerable number of calls for projects suggests major fragmentation, if not a lack of overall control, all the more marked in that it was exacerbated locally by the distribution, according to the same terms, of the funding of universities, CHUs and regions. This aid thus sometimes constituted a kind of "second chance" for projects that failed to obtain national funding. The support provided to researchers by their associated institution, positive though it is, has often resulted in a dispersal of resources that fails to provide guarantees against redundancy and fails to encourage synergies. Calls for projects are an undeniable motivating factor for research. However, their multiplication has limited the emergence of an intelligible overall strategy. Furthermore, the number of decision-making centres, administrative or comitological, highlighted the absence of a leader. No institutional stakeholder had any real power to regulate research priorities and funding during the crisis[36]. Disconnection phenomena have been observed, in initiatives at both national and local level. The reverse has also fortunately been observed in a few cases. On the Lyon site, for example, a number of stakeholders participated in the same research operations in a coordinated manner: university, CHU, COMUE, region, competitiveness cluster and foundation, which seems to be a guarantee of greater effectiveness. At the top of the edifice, the MSS and MESRI ultimately had little coordination of their projects, despite undeniable initial willingness and the organisation of many interministerial meetings in an unprecedented format. Each ministerial department finally followed a policy of support for research that was specific to it and did not necessarily meet the same objectives. The MESRI has therefore put in place a specific administrative centre policy, with direct funding allocated in a discretionary manner to certain research laboratories, sometimes without even informing their local supervisor, at the risk of cutting themselves off from academic governance structures and operating in too isolated a manner. The MSS also had its own funding strategy, mainly focused on clinical research hospital (PHRC) programmes.

[36] Senate, *Public Health: for a new start - Lessons from the COVID-19 epidemic,* Report No. 199 of 8 December 2020, Q1, p. 248.

The research frenzy that began in early 2020 showed the need for comprehensive and regularly updated research databases. The development of certain initiatives, such as the online website WPRN (world pandemic research network), which lists studies in the humanities and social sciences during the crisis[37], would, if carried out in the field of biology-health research, make it possible to improve effectiveness and avoid engaging in dispersed work. This type of tool should be hosted by the MESRI.

2. INSUFFICIENT PRIORITISATION OF RESEARCH

The launch of calls for "flash" projects on a pathology, while it is already widely affecting the population, however imperative this may be, is obviously difficult to reconcile with rigorous structuring of scientific approaches over the long term. In the first analysis, despite the funding of the Covireivac platform by the MSS and the MESRI, it appears that the funds mobilised for vaccine research were not the subject of a large-scale and coordinated commitment. Excluded from the scope of calls for projects by the ANR, vaccine research received overall financing of €11 million by the MESRI emergency fund, and €7 million directly from the MSS, representing a total of around €20 million (excluding PHRC). It is difficult to establish the choices, made or unmade, which are responsible for this situation upstream. In addition, no fewer than 350 therapeutic and clinical trials are listed in July 2020. According to many observers, these tests would have neutralised each other, notably by drying up the pool and availability of volunteer patients to participate in the tests. In addition, in order to bring together experimental cohorts in sufficient numbers of patients, the transition to European level has not been successful, provided it has been sought.

Insufficient cohorts of patients for carrying out vaccine research

In his report "Clinical trials in the epidemic context" dated 7 June 2020, Professor Patrick Rossignol indicated that to meet the needs of the 98 Category 1 trials (not risk-free) then in progress, a total of 34,000 patients would have had to be recruited. He noted that "these recruitment objectives appear unrealistic and certainly counter-productive given competition between studies, some of which are, moreover, potentially redundant and some scientifically outdated" (report p.14).

The comparative view makes the structural difficulties in France even more salient, illustrated in the eyes of public opinion by the absence of a vaccine design. As noted by the Chair of the CARE Committee: "*The establishment of a few small production units outside the commercial sector - capable of operating in accordance with the standards of Good Manufacturing Practices (GMP) and backed by universities (as is the case at Oxford University) or research institutes, would allow us to quickly test new concepts in humans* "[38]. For example, Oxford University was able to rapidly develop its vaccine candidate due to the existence of a small production unit, the *Clinical Biomanufacturing Facility*. There is an urgent need to

[37] The crisis has also strengthened the already identified need for research in the field of the humanities and social sciences to inform public decision-making and analyse societal developments. Unlike experimental research, particularly in life and health sciences, the humanities and social sciences are less accustomed to CFPs, especially when targeted thematically. Nevertheless, they have shown a good ability to respond urgently.

[38] Hearing by F. Barré-Sinoussi before the Senate Committee on Social Affairs, 7 May 2000. The success of Pfizer / BioNtech and Moderna vaccines is linked to access to the production of RNA messengers under GMP conditions, which has enabled this innovative solution to be tested quickly.

consider providing some public research centres with the ability to conduct preclinical or clinical trials in accordance with the best international standards.

Several research units have been able to collaborate with companies, notably through the support of Technology Transfer Acceleration Companies (SATTs) and companies that sometimes form part of competitiveness clusters. Public research provides expertise and access to technology platforms. The links established in this way should be strengthened. In the same vein, it is also necessary to improve the transfer of fundamental research to industrial development, by offering better support to researchers in the start-up creation process. This requires actively supporting the biotechnology infrastructure, which is still underdeveloped in France[39].

It is therefore necessary to provide long-term public support to national infrastructures from the PIAs, as well as to the indicated health biology platforms of public research institutions.

3. RIGIDITIES

The majority of researchers welcomed the responsiveness of the funders, including the ANR. However, they regret the administrative burdens which are inappropriate in times of crisis, especially for obtaining prior authorisations. Given the necessary and irreducible time between the response to CFPs ("flash" or not), the publication of results, the actual installation of funds in laboratories and sometimes scarce supplies, the projects could only really start at the beginning of the summer, or even in autumn 2020. In the mixed research units, which apply different operating methods according to their multiple supervisory associations, the collaborative procedures of CFPs have lacked flexibility. Transfers between partners often proved impossible, except with derogations granted on an exceptional basis, a bureaucratic ordeal that was wasteful of time and energy. Finally, the crisis highlighted the need to harmonise the management rules within the UMRs. Research organisations must converge, with each other and with universities, in order to align their budgetary operating procedures, thereby offering the simplification demanded by the research community. These structural difficulties, however long-standing they are, become critical in an emergency situation.

[39] According to the Economic Analysis Council, the share of French biotechnology companies is down and the average financing ticket for these companies by venture capital investors stands at 9 million in France, compared to 12 million in the United Kingdom and 16 million in Germany. The CAE also stresses "the slow decline in France" in terms of patents between the mid-1990s and the 2000s", and points out that Germany devotes 3% of its GDP to R&D, while in France it is 2.2%. See "Pharmaceutical Innovation, how to close the French lag", CAE Note No. 62, January 2021.

An illustration of administrative slowness: the implementation of the CHIP COVID-19 project

1. File submitted to the ANR on 27 April 2020 and accepted on 4 June 2020. Contract signed on 8 June 2020.

2. ANR agreement received by the University of Paris on 2 September 2020, and freeing up of money by the ANR on 17 September 2020 (€59,000), or three months after the signing of the contract.

3. The 100 DNA samples of COVID-19 patients obtained from the French-Covid (Inserm/REACTing) cohort are delivered late. First request on 9 April 2020, accepted on 23 October 2020, with authorisation to transfer samples signed on 30 October 2020. The Inserm clinical research centre, however, requested a new transfer agreement on 4 December 2020 (to improve the traceability of samples), finally signed on 25 January 2021. Samples are unblocked on that date.

4. The application file for 100 samples of COVID-19 patients, submitted to the APHP on 9 April 2020, has never been accepted, despite numerous negotiations, and the submission of preliminary data that could validate the scientific approach used.

5. Given all the accumulated delays, the project sponsor is applying for DNA samples in England in autumn 2020. The application was accepted in less than one month and samples (approximately 350) are delivered in less than two months. Sequencings start at the end of 2020.

In terms of public procurement, the administrations did not fully take advantage of the provisions of the Order of 25 March 2020 which covers contracts in progress or concluded during the state of health emergency. In addition to numerous relaxations of procedure, it allows a public contract to be awarded without advertising or competition, for reasons of general interest[40]. This latter provision, generating time-savings, was discovered late by the research operators, who feared possible litigation due to the fact that the text was too vague. They generally preferred to apply the less comfortable but better known provisions of the 2015 Order, which, in exceptional circumstances, allows for the reduction of consultation times (simple emergency) or, exceptionally, the resort to a contract without advertising or competition (urgent emergency)[41]. Since the notion of imperative urgency is strictly applied, it has seldom been used during the crisis[42]. In order to be fully exploitable, operators should have been offered specific support for these exemptions from ordinary law; some operators, such as

[40] Provisions of the Order of 25 March 2020 codified in Article R. 2122-1 of the Public Order Code.
[41] Order No. 2015-899 of 23 July 2015 on public contracts and its implementing decrees of 25 March 2016.
[42] Inserm indicated that it was activated to urgently order FFP2 and 3 masks and to implement the *Discovery* clinical trial.

Inserm, recognise that they have been under-used[43]. Similarly, complexities continue to exist in relation to recruitment and international cooperation.

Academic or hospital research centres have regularly suffered from problems in the supply of equipment for care facilities, but sometimes they have been assisted locally by civil society (manufacture of protective equipment, donations of stocks by individuals or businesses). It must be possible to stimulate the responsiveness of logistics circuits in the event of a crisis by prior planning and financial support that is as close to the ground as possible.

Universities and research organisations have shown that they are an important regional network in connection with local governments. The public authorities should rely more on this group, by also promoting better integration of some researchers or laboratories located in the regions into international networks.

The historical partitioning between the various operators which are research organisations, universities and CHUs, and the overly narrowly-focused operation of each of them, may have been a critical obstacle to providing the appropriate responses quickly.

4. POSSIBLE AREAS FOR IMPROVEMENT

In the coming months, it will be necessary to draw up a catalogue of best practices and innovations revealed in times of crisis, and to study the possibility of their dissemination. Attention should also be paid to a few systemic blockages.

- **Organise crisis management governance and appoint a lead manager.** For the future, it would be necessary for the public authorities to reflect on how scientific research can be made more responsive in times of crisis. The various stakeholders in the scientific community are clear. They are already convinced of the need for a single steering structure, which is responsible for the programming and launch of calls for projects, the evaluation of proposals received and the allocation of resources. In the field of the life sciences, this mission, at the national level, could be carried out by Inserm, provided it has more appropriate means (ANRS-MIE, Alliance AVIESAN)[44]. The MSS refers to the project to create an "Agency for Innovation", without providing more details at this stage[45]. The lack of steering observed in this crisis justifies, in addition to rapid clarification, the establishment of a "research continuity plan" in order to mobilise researchers in the event of a new major health crisis and to reduce the

[43] The European strategy as applied deserves an in-depth analysis, based on feedback, to understand how it worked and how it can be improved. It would be interesting to assess with industry the impact of this strategy on their commitments in terms of product development in order to increase the effectiveness of the European approach.

[44] The two academic establishments of medicine and pharmaceuticals recall the position that the Aviesan Alliance should occupy in leading this coordination work (see report "Reforming Research in Biological Sciences and Health: Part II, the organisation" of the National Academy of Medicine published in March 2021). The MSS indicates that steering by an agency whose governance is shared between public institutions, EPSTs and research stakeholders would be more appropriate.

[45] This proposal seems to be based on the one carried out by France Biotech (association of all entrepreneurs in the Healthtech sector: biotech, medtech, e-health, artificial intelligence) in its Health Innovation Plan unveiled in the autumn of 2020. It would be a new authority, to which the main health bodies would contribute, and the creation of which should be accompanied by a health programming law providing three-year or even five-year spending forecasts.

bureaucratic burdens that remain despite all the efforts made. In more forward-looking terms, funding for health research is increasingly required to follow an economic model based on two principles: public-private partnership, which involves risk-taking, and concentration of resources.

- **Give priority to fundamental research in the biology/health field.** The lack of therapies available immediately or in the short-term is partly related to the lack of sufficient funding in some areas of fundamental research[46]. While it is true that significant and long-term funding has been given to fundamental research for infectious diseases, such as AIDS/HIV, hepatitis and tuberculosis, through the creation of the ANRS in 1988, or for so-called ageing diseases (Neuro-degenerative and Cancer Diseases), the scientific community agrees that the field of fundamental research has suffered from insufficient funding in the past two decades, particularly in the area of infectious coronavirus-type diseases, which have been identified for several decades. The age pyramid and globalisation have made France and Western countries vulnerable to diseases wrongly thought to be circumscribed to inter tropical countries. This has been neglected. The emergence of new vaccine strategies (messenger RNA vaccines in particular) shows that the therapies of tomorrow have been developing for a long time, through risk financing and massive investment in their transfer and marketing. A more regular investment in some areas of fundamental research and hospital clinical research is needed, in order to have more favourable conditions for the urgent development of therapeutic solutions in the event of health crises[47]. A long-term effort, if necessary initiated by the Law of Research Programming (LPR), the Recovery Plan and PIA 4, should be continued to support research infrastructures and researchers over the long term.

- **Ensure a research continuum in a manner similar to the way that foreign research is organised.** Foreign examples show that integration between academic research and industry can be the core of national scientific policy. At the European level, significant funding is planned for collaborative projects focused on research partnerships. It is desirable to strengthen the funding of fundamental research at European level, in support of national contributions, both in the ERC budget[48] and in the budgets dedicated to collaborative research. At the international level, it would be useful to develop funding instruments for international collaborative research that will make it possible to combat pandemics more effectively.
In addition to financing, the regulatory environment is particularly complex in France and Europe, which can be a barrier to innovation.

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[46] This observation, valid in France, is also applicable worldwide. The Court has already had occasion to question the proper allocation of research funding in France, in its June 2013 thematic public report, "Public funding for research, a national issue".

[47] As the Economic Analysis Council [Conseil d'analyse économique (CAE)] noted in January 2021, public R&D funding for health in France fell by 28% between 2011 and 2018 and now amounts to half of the public funding in Germany. See also the report of the National Medical Academy of March 2021 (op.cit.), which estimates that the budget for biology-health has decreased by 25% between 2008 and 2020 (Part 1 of the report, p.5).

[48] ERC (*European Research*Council) finances individual grants for projects of scientific excellence as part of the Horizon Europe programme.

CONCLUSION

The results produced in this audit seek to give the most accurate and objective reflection of the amounts committed by France, with the support of European financing, in the fight against COVID-19, since March 2020. By definition, they are provisional, since new calls for projects were launched at the beginning of 2021, particularly by the ANR, and are still ongoing. It will therefore be necessary to carry out a new assessment at the end of the crisis.

However, lessons can already be learned, the foremost of which appears to be that France has mobilised €530 million allocated to support research funding during the first period of the health crisis. However, this large amount is still behind when compared to the funds provided in Germany or the United Kingdom.

In reality, the difficulty was not to mobilise funding, but rather to set up organisational chains to allocate it to strategically effective and targeted expenditures, which has often proved to be problematic with the dispersal of decision-making centres.

Beyond that, the analysis of the crisis period remains incomplete, and even misleading, if it is not replaced over the long term. The financial resources allocated during this crisis period should not mask the fact that research is organised very much upstream and is structured around a policy of prioritisation, significant recurring funding and selective financing, which, through risk-taking, disruption and development, bring forward innovative treatments for emerging diseases.

Failing this, exceptional resources - significant though they may be - unlocked on an emergency basis, may prove to be too late.

LIST OF ABBREVIATIONS

CFP..... Call for Projects

AFD..... French Development Agency

AMI..... Call for expressions of interest

APHM..... Assistance Publique-Hôpitaux de Marseille

APHP ..... Assistance Publique-Hôpitaux de Paris

ANR ..... National Research Agency

ANRS..... National AIDS and Hepatitis Research

ANRS-MIE ..... National AIDS and Hepatitis Research Agency Emerging Infectious Diseases

ARS..... Regional Health Agency

AVIESAN ..... National Alliance for Life and Health Sciences

ATHENA ..... National Thematic Alliance Humanities and Social Sciences

AllENvi ..... National Environmental Research Alliance

CAPNET ..... National Steering Committee for Therapeutic Trials

CARE..... Analysis, Research and Expertise

CEA..... French Atomic Energy and Alternative Energy Commission

CHU ..... University Hospital Centre

CHRU..... Regional University Hospital

CNRS..... National Centre for Scientific Research

COMUE . Group of Universities and Institutions

DGESIP ..... Directorate General for Higher Education and Professional Integration (MESRI)

DGOS ..... General Directorate for Healthcare Provision

DGRI..... Research and Innovation Directorate (MESRI)

EPST..... Public scientific and technological institution

F-CRIN..... French Clinical research infrastructure network

GHT ..... Territorial Hospital Group

ICAN ..... Institute of Cardio-Metabolism and Nutrition

IDEX..... Initiative of Excellence

IHU..... Hospital-university Institute

INRAE..... National Research Institute for Agriculture, Food and the Environment

INSB..... Institute of Biological Sciences (Institut des sciences biologiques) (CNRS)

INSERM . National Institute of Health and Medical Research

IRD..... The Research Institute for Development

RPA..... Research Programming Act

MERRI ..... Education, Research, Reference and Innovation Missions

MESRI..... Ministry of Higher Education, Research and Innovation

MINARM ..... Ministry of the Armed Forces

MSS ..... Ministry of Solidarity and Health

WHO ..... World Health Organisation

PIA ..... Future Investment Programme

PEPR ..... Priority Research Programmes and Equipment

PHRC..... Clinical Research Hospital Programmes

PHRC-I..... Interregional Clinical Research Hospital Program

PSPC ..... Structured Projects for Competitiveness

REACting ..... REsearch and ACTion targeting emerging infectious diseases

SHS..... Humanities and Social Sciences

UMR..... Joint Research Unit

SATT..... Technology Transfer Acceleration Company

APPENDICES

Appendix n° 1. Main financial data in France

Table n° 13 : MESRI research funding during the health crisis

	Projects financed	Amount (in €million)
Support for calls for projects from the ANR	CFP Flash COVID-19	8
	CFP COVID-19 research initiative of the ANR	8
Top-down *funded research initiatives excluding calls for projects (€12.3 million)*	OBEPINE network	3
	CNRS and INRAE priority projects related to the health crisis	2.9
	Contribution to financing the development of a saliva test	0.35
	EpiCov and SAPRIS (projects to describe and understand the epidemic and its national health and social consequences)	5.1
	Project on the importance of interferon in the immune response to COVID-19	1
	Open science and COVID-19	1
	MESRI contribution to CFPs of regions most affected by the epidemic (Hauts-de-France (€1 million) and Grand Est (€1 million)	2
COVID-19 vaccine research (€10.8 million)	Three vaccine projects selected by CARE, including Inserm, UPEC, IPL, CEA	5.5
	Covireivac platform	3
	Comparative academic vaccine tests of immunogenicity (COVICOMPARE)	2.3
CARE	21 projects on which CARE delivered a positive opinion	1.6
REACTing	Operation of the REACTing consortium and pre-financing of projects by REACTing	1.75
Europe and international	COVID-19 South call for projects 1 to 13 April 2020 (Inserm / ANRS)	1.2
	EDTCP (*European and Developing Countries Clinical Trials Partnership*) (Article 185 of the Treaty of the European Union) (call for international projects launched on 3 April 2020)	1
	Funding of the exceptional bonus for research organisations	4.1
	Total	**51.8**

Source: MESRI

Table n° 14 : MSS research funding during the health crisis

Types of financing	Amount (€ million)
Financing of CHUs under existing CFPs	
Clinical Research Hospital Program (PHRC) (wave 1 and 2)	11
	22
PHRC-I	4
Accelerated funding of CHU research projects on an ongoing basis, excluding calls for projects	12
Total funding for CHU COVID research projects	**49**
Non-CAPNET funding for priority research projects (programme 204)	
Covireivac	4.2
Phase 2 studies of immunogenicity (COVICOMPARE Moderna and Covicompare Pfizer conducted by APHP)	2.5
EpiCov (Health Consequences of the Crisis)	4.9
Total	**11.6**
Total financing	**60.6**

Source: MSS

Table n° 15 : the financial resources mobilised by the 25 hospital-university centres (CHUs) surveyed

Funders	**Amount (€ million)**
MSS (financing of calls for projects)	32.9
Patronage	5.2
CHU (own resources)	4.5
Bpifrance	3.9
Industry	3
Local authorities	2.7
ANR	2.3
IDEX/I-SITE University	2
Other (scientific societies, EPST, associations, etc.)	1.4
COVID-19 National Administrative Centre	0.8
ARS Regional Health Agency (Agence régionale de santé)	0.3
Europe	0.3
Ministry of the Armed Forces	0.3
GHT	0.06
Total funds mobilised by the CHUs	**59.66**
Total funds mobilised by the CHUs (excluding ANR and PHRC)	**24.4**

Source: Court of Accounts according to CHU's Conference of Directors

Table n° 16 : the financial resources mobilised by universities

Universities	Total funds committed (€ million)
Sorbonne University	5.53
Paris-XII- Créteil-UPEC	4.35
Paris	2.67
Lyon-I	2.22
Bordeaux	1.80
Aix-Marseille	1.69
Strasbourg	1.53
Lorraine	1.33
Paris-I	1.30
Clermont Auvergne	1.21
Paris-XIII Sorbonne Nord	0.97
Grenoble Alpes	0.97
Lille	0.93
Paris-XI- Saclay	0.86
Corsica	0.64
Limoges	0.59
Littoral	0.56
Nantes	0.52
Montpellier	0.48
Paris-Dauphine	0.47
Versailles Saint-Quentin-en-Yvelines	0.47
Reims	0.46
Nice	0.46
Saint-Etienne	0.40
Caen	0.40
Rouen	0.38
Paris-II	0.38
Poitiers	0.32
Haute -Alsace	0.23
Orléans	0.20
Rennes-I	0.19
Pau	0.18
Picardie	0.12
La Rochelle	0.12
Lyon-II	0.09
Dijon (Bourgogne)	0.05
Nîmes	0.05
Paris-X	0.04
Perpignan	0.02
Lyon-III	0.02
Franche-Comté	0.01
Mans	0.00
Artois	0.00
Cergy-Pontoise	0.00
Toulon	0.00
Bretagne Sud	0.00
Chambéry	No response
La Réunion	0.00
Toulouse-I	No response

Universities	**Total funds committed (€ million)**
Marne-la-Vallée	0.00
Toulouse-II	No response
Avignon	0.00
Toulouse-III	No response
Havre	0.00
Tours	0.00
Evry-Val d'Essonne	No response
Valenciennes and Hainaut Cambrésis	0.00
Montpellier-III	0.00
Paris-III	0.00
Brest	0.00
Rennes-II	0.00
Paris-VIII	0.00
Angers	0.00
Bordeaux- Montaigne III	0.00
Grand total	**35.23**

Source: Court of Accounts based on questionnaire responses

Appendix n° 2. International comparisons - financial assessments

This table makes it possible to compare orders of magnitude, but also to note that the organisation in each case was a decisive factor[49].

Instruments	Date	Operator	Purpose	Recipient	Amount
United States					
Coronavirus Preparedness and Supplemental Appropriation Act	6 March 2020	*BARDA, NIAD, FDA*	R&D vaccines, therapies, diagnostics, other health technologies	Public and private research organisations	
Coronavirus Aid, Assistance and Economic Security Act (CARES ACT)	25 March 2020	*DOD*	Development of vaccines and antivirals, laboratory tests and purchase of tests	Public and private research organisations and test producers	
Paycheck Protection Program and Health Care Enhancement Act	23 April 2020	*Public Health and Social Services Emergency Fund (HHS)*	Research and development, production validation, purchasing and management and increased test capacity.	Federal agencies (including *CDC*, *NIH*, *Barda FDA*)	
Total announcements 2020, package of 21 December 2020 excluded, excluding purchase of vaccine doses and tests					**$11.56 billion i.e.: €9.63 billion (€1 = $1.2044 as of 4 May 2021)**

[49] The figures in the table above, as well as the following comments, are based on evidence that our embassies in Washington, Berlin, London, the Hague and the PREU sent to the Court.

United Kingdom					
Calls for research projects	February 2020	*UKRI, NIHR*	Broad call for projects ($500 million) and quick-effect projects ($24.6 million)	Public and private research organisations	£524.6 million
Vaccine University Research	March-May 2020	*UKRI, NIHR*	subsidies	*University of Oxford, Imperial College of London, University of Cambridge*	£130 million
Multilateral cooperation *Coalition for Epidemic Preparedness Innovations* (CEPI)			R&D	Research organisations, clinical trials, etc.	£210 million
Support for variable coalitions of UK operators		*DHSC*		Universities, public institutions, charities, intuitu personae	£32 million
Strengthening of the research base for production in the national territory	May-July 2020	*BEIC*	*Vaccine Manufacturing Innovation Centre (VMIC)* *Cell and Gene Therapy Catapult Manufacturing Innovation Centre*	Public and private research and production operators	£231 million
Total					**£1,127.6 million or €1.30 billion (£1 = €1.1556 as of 4 May 2021)**

Germany					
Direct support for biotechnology companies	May-October 2020	*BMF, BMBF*	vaccines	BioNTech, Curevac, IDT Biologika, *Prime Vector Technologies Programme* companies	€1,068 million
Calls for projects	July 2020 – 6 January 2021	*BMBF*	Therapeutic research	Public and private research laboratories	€95 million
Participation in international initiatives	March 2020	*BMBF*	Therapeutic research	*CEPI (140) Solidarity (WHO)(1.5)*	€141.5 million
Coordination of clinical research	March 2020	*BMBF*	Establishment of a national network of medicine for covid 19	CHU	€100 million (€50 million 2021)
Länder action			Therapeutic research	Public and private laboratories, pharmaceutical and biotechnology companies	€130 million
Total					**€1,534.5 million**
Netherlands					
Calls for projects	March-April and 2nd half 2020	Minsanté, Minrecherche, Government Agencies	Projects with quick effects (€6.5 million) and call for projects until 2024 (€108.5 million)	Public and private laboratories	€115 million
International contribution		*CEPI*	*ACT-19 (*€192 million, including a research portion, but also the purchase of diagnostics and vaccines, etc.) *CEPI (€50 million)*		€50 million
Total					**€165 million**

European Union (budget)					
Horizon 2020	March 2020	Commission Call for projects	research	Member State laboratories	€48.2 million
Horizon 2020 Plan ERAvsCorona	April 2020	Commission			€816 million
		Commission Pilot Phase Accelerator *EIC (European Innovation Council)*	Calls for projects	SMEs and *start-ups*	(€166 million)
		IMI2 Joint Undertaking Commission	Partnership with the European Federation of Pharmaceutical Industry Associations	Biotechs and pharmaceuticals	(€117 million)
		Commission *InnovFin Infectious Diseases Financial Facility (IDFF)* and *EIB* interventions		Biotechs active in vaccines	(€400 million)
		Research Infrastructures		Additional financing	(11 million)
		Call for projects	Commission	Member State research laboratories (€122 million)	(€122 million)
Emergency aid instrument		Commission			
		Commission BR 2 (€1.4 billion), BR 6 (€1.1 billion), Contribution from Member States (€750 million)	Early purchase contracts and treatment financing (Velkury €70 million), clinical trials (€1 million) UV robots (€12 million)	Biotechs and pharmaceutical companies	€3,250 million

Coronavirus Global Response Brussels Conference Horizon 2020	4 May 2020	Commission	The Commission has mobilised €1.4 billion through the routing of existing programmes (horizon 2020, RescEu, Emergency Support Instrument, External Policy Instrument) + Commission contribution to the CEPI and WHO		
	Horizon 2020		*CEPI*	European laboratories, SMEs and *start-ups* active in biotechnology	€100 million
	Horizon 2020		*EDTCP (European and Developing Countries Clinical Trials)*	Clinical trials, partnership with Sub-Saharan Africa	€25.5 million
External policy instruments				Strengthening monitoring and research capacity in developing countries	€170 million
Total					**€4,410 million**

Source: Court of Accounts based on questionnaire responses

Answers of the administrations and bodies concerned

Contents

Recipients with no observations

President and Chief Executive Officer of the National Research Agency (ANR)
General Manager of the Office of the Commissioner of Atomic Energy and Alternative Energy (CEA)
Chief Executive Officer of the French Development Agency (AFD) Group
Director General of the Pasteur Institute Lille

PRIME MINISTER'S RESPONSE

I would like to thank the Court of Accounts for its work, which leads to recognition of the full commitment of French research to the fight against the COVID-19 pandemic. The observations, of substance and form, which the report elicits from me are set out below,

Research results must be considered over the long term

The absence of a French vaccine at the time of the audit tends to obscure the progress of other vaccine projects (Valvena, Sanofi, VRI, O and research still underway, and to cast things in a no doubt more severe light than necessary, as research is by nature an activity that unfolds over the long term.

In fact, beyond the actions undertaken that it was possible to list in the flash audit project, the impact of research undertaken during the period of the epidemic should be measured over the medium and long term, most especially when it has been possible to publish and exploit all of the results, particularly in terms of technological or social innovation.

In addition to vaccines, the French research effort allowed advances to be made. As highlighted by the Court, the results obtained, for example, in terms of sequencing and testing development were remarkable and partly explain the success of the test policy conducted in France. More generally, the Court's analysis might have included other results, such as the number of publications produced and their impact.

Revisiting the scope of COVID-19 research funding, particularly in the context of a European comparison

The Court's analysis only seems to take into account the additional national public funding allocated in France to public research on Covid. It would be appropriate to add, on the one hand, the recurring financing granted as well as the effort to support private or international research. The PIA calls for projects and in particular the capacity-building project, which mobilised very substantial funding to support private research and production capacity development (nearly €460 million for this call alone) could have been mentioned in particular.

In addition, the scope used for international comparisons includes, on the contrary, other types of financing. Thus, the assessment used for Germany includes €1.1 billion in funding allocated to biotechs, which would therefore deserve to be compared to the efforts carried out by France in this context. The assessment for the Netherlands includes funding for international research efforts. Finally, the European Union assessment includes more than €4 billion dedicated to vaccine pre-purchases, in relation to which France's strong action in launching and structuring this initiative and these resources could be noted.

Lastly, the payroll of researchers in the public service who participated in the research effort is not taken into account in France, as the funds selected are mainly intervention funds, contrary to the methodology used for some international comparisons. It is therefore estimated that for similar scopes of action, the costs calculated in Germany are 2.5 times higher than in France. This comment would deserve to be included in the international comparison section of the audit.

More generally, on funding for research, the Court notes (p. 33 of the version sent) that "the lack of therapies available immediately or in the short-term" – which was said to be "partly related

to the lack of sufficient funding in certain areas of fundamental research"– is an "observation, valid in France, [which] is also applicable worldwide."

Long-term commitment of the State and evolving financial intervention tools

In general, in order to have a comprehensive view of the State's commitment and while the virus is still circulating, it is necessary to complement the current state of the analysis to integrate all the resources mobilised throughout the period covered by the pandemic.

Indeed, significant amounts were committed after March 2021: the National Agency for Research (ANR) mobilised 2.95 MG as part of the Resilience Project (39 projects selected out of 147 submitted, or 26%) and resources were raised for the financing of therapeutic trials as part of the ad hoc steering committee for national therapeutic trials (CAPNET). 34.2 MG was committed to the budget of 51 MG provisioned in April 2021.

The flash audit highlights the risk of the scattering of initiatives and insufficient prioritisation of research. Faced with this risk, the ministers responsible for research and health asked Professor Patrick Rossignol, after the first wave of the epidemic, to draft a report on clinical trials in epidemiology context.

This assessment led to the creation in January 2021 by the National Institute for Health and Medical Research (Inserm) of the National AIDS and Hepatitis Research Agency–emerging infectious diseases (ANRS-MIE). The purpose of this agency is to conduct and finance research on infectious diseases emerging during health crises or during inter-crisis periods, in order to strengthen the limited capacity available to REACTing.

This also led to the creation of CAPNET in autumn 2020, by the ministries responsible for research and health. The CAPNET is based on the scientific priorities established by the ANRS-MIE and on the scientific assessments of therapeutic studies carried out by its Scientific Council. In addition to funding, it also gives exclusive access to a "fast-track" procedure for reviewing authorisation files by the Ethics Committees [Comités de protection des personnes (CPPs)] and the National Agency for the Safety of Medicines and Health Products (ANSM). This fully new integrated mechanism for prioritisation-financing - "fast-track" has de facto granted the new agency, from its creation, in collaboration with the Government and the regulatory agencies, resources for emergency intervention in response to COVID-19.

Thus, it is worth stressing the very high adaptability that the research funding system has demonstrated: it was able to modify its model in depth once the risks of the scattering of initiatives had been identified.

Although desirable, the definition of research priorities cannot, however, constitute a guarantee of success. While calling for prioritisation of appropriations and the development of selective financing, the Court itself recommends maintaining "significant recurring appropriations" (page 34 of the version received). This is what the Government focused on by adopting the law on research programming in December 2020, which aims, among other things, to increase the basic provision for laboratories, but also to finance priority research programmes and equipment as part of acceleration strategies on health themes (see below) of the 4th future investment programme (PIA4).

The Government is preparing for the future.

It should also be noted that it was, in large part, feedback received since the start of the Covid-related health crisis that led to the "Health Innovation 2030" plan announced by the President of the Republic on 29 June. As far as research is concerned, this plan will result in a strengthening

of our biomedical research capacity (€1 billion), and increased investment in specific areas: development of biotherapies, so-called 5 P medicine (preventive, personalised, predictive, participatory and based on proof) and pandemic preparedness, as well as support for the management and acceleration of the implementation of clinical trials.

In addition, as part of PIA 4, an acceleration strategy was launched on emerging infectious diseases– nuclear, radiological, biological and chemical threats. This strategy aims to understand, prevent and control the emergence or re-emergence of infectious diseases. It will mobilise €750 million, of which €80 million will be allocated to the ANRS-MIE for the implementation of a dedicated research programme on emerging pathogens and the pathologies they generate. This funding will increase the budget of the ANRS-MIE and broaden the themes of its calls for projects. In addition to this financial component, the preparation of legal and practical arrangements that can be activated in the event of a crisis is planned. The latter component will thus respond to the need identified by the Court to organise crisis management governance. This strategy will also be reinforced by the related strategies launched on biotherapies and digital health, which, in total, will enable nearly €2 billion to be mobilised on these •health challenges, including more than €200 million specifically for research support.

Finally, the creation of a Health Innovation Agency, also announced by the President of the Republic, will make it possible to:

Define a national health innovation strategy and ensure its implementation, including anticipation and responsiveness in the short term and strategic vision by 2030, in line with the research challenges in which France wishes to invest and in order to anticipate future health crises;

Simplify and clarify existing processes to speed them up, where appropriate, by proposing to the Government the institutional organisational transformations necessary for this acceleration;

Provide a privileged and well-known interlocutor for the stakeholders in health innovation, enabling synergy between them, guiding the drivers of innovation and supporting them;

Ensure the implementation of the 2030 health innovation plan and report to the Government on the proper implementation of all measures, where appropriate by proposing adaptations.

RESPONSE OF THE CHIEF EXECUTIVE OFFICER OF THE NATIONAL CENTRE FOR SCIENTIFIC RESEARCH (CNRS)

First of all, I would like to welcome the Court of Accounts' initiative in favour of an audit on the "Financing of public research in the fight against the COVID-19 pandemic", to which the CNRS and the many teams involved in the matter have committed to answer as precisely as possible within the allotted time frame.

I would also like to welcome the innovative nature of this flash audit, which is the subject of an accelerated procedure on a topical issue.

It is of course an important audit for research organisations and their partners as the COVID-19 crisis impacted the lives and engaged the efforts of laboratories that never stopped their research during successive lockdowns.

This audit helps to highlight this tremendous national commitment. While it reveals the strength of the plurality and inter-disciplinary character of the CNRS, which makes it possible to integrate the dimension of SHS into the handling of this crisis, it does not fail to point out the limits

of the French research system, which were crystallised during the crisis in terms of funding but also management.

We share the finding that there has been too great a dilution of initiatives and of funding sources and that this has prevented the fully effective implementation of a coordinated control strategy.

Finally, there remains a question about private sector investment, regarding which it can be asked whether it is, in terms of research and innovation, able to meet the health challenges and international competition.

In the end, this audit does not call for further comments from us.

The CNRS remains at your disposal to continue this fastidious work of assessing research funding, both in health and other fields.

RESPONSE OF THE CHIEF EXECUTIVE OFFICER OF THE NATIONAL INSTITUTE OF HEALTH AND MEDICAL RESEARCH (INSERM)

Inserm shares many of the Court's findings on biomedical research, whether in terms of prioritisation and level of funding, which has been stalling for many years compared to our major international partners, the need to coordinate French research stakeholders throughout the continuum of fundamental research to clinical and population research, or to build strategic and long-term national programming by adopting priorities in order to avoid a scattering of resources.

As the flash audit rightly points out, the health crisis we are going through has unflinchingly illustrated the strengths and weaknesses of French health research, highlighting both the resources of creativity and commitment of our researchers, as well as the current limitations of our system. For Inserm, in line with most of the conclusions of this audit, it is now a matter of drawing on these lessons to drive the necessary changes and prepare to deal with other crises. And as the Court rightly says, crisis research cannot be separated from long-term research, whether at its funding levels, to maintain teams and infrastructure at the highest level, in its governance, to take responsibility for a substantial part of research programming and promote effective mobilisation of the various stakeholders, or in its administrative processes. Research is therefore structured very much upstream (priority areas, recurring funding, selective financing to promote risk-taking and progress on the frontiers of knowledge, etc.), in order to anticipate, in an independent manner, the challenges with which we will undoubtedly be confronted.

Strengthening fundamental research and innovation

In this way, Inserm will be proactive alongside its governing bodies, in building, defending and leading, in parallel with free research which is indispensable to the advancement of knowledge, research supported by major programmes such as the Research Senior Research Programmes and Equipment (PEPR) targeted in areas with high impact, aligning research forces and societal challenges. The national position of Inserm, under the dual supervision of the ministries in charge of research and health, its scope over the entire continuum of research from the most fundamental to the most applied, or the experience of its subsidiary Inserm Transfer in terms of development and public-private partnership, make it a solid player on which the State can rely to develop and coordinate a genuine health research and innovation strategy. Some programmes have already been entrusted by the State to Inserm, and have demonstrated the concept (anti-bioresistance, rare diseases, fundamental research component of the Cancer plan, in connection with the Inca…).

The PEPR on emerging infectious diseases is also entrusted to it through the ANRS-MIE, an internal agency of Inserm, created on 1 January 2021. Indeed, in the field of emerging infectious diseases (EMI), bibliometry elements confirm the risk of French fundamental research stalling. Already strongly committed to diagnostic, therapeutic and vaccine research, but also in favour of research in developing countries, the ANRS-MIE, with the support of Inserm, will address this lack of fundamental research, as the ANRS has done in its historical field of the battle against HIV-AIDS.

Coordinating research during normal times and in an intensified manner during times of crisis

These programmes will help sustain the momentum towards increasing and concentrating funding and strengthening leadership, steering and scientific coordination in the areas concerned. These new non-crisis working arrangements will prepare the stakeholders to work in a more coordinated manner and with a more clearly defined management orientation during times of crisis. At the same time as acculturation to new ways of working that focus more on the ensemble rather than the institutions, it will obviously be necessary to quickly include research in health crisis management plans in order to anticipate very precisely the roles each stakeholder will play and the processes considered as a whole. Health crises are often by definition periods of high uncertainty, in which expertise, that is, a detailed and exhaustive knowledge of the different parameters, reaches its limit. Research therefore also has a major role to play in this context. Anticipation of emerging disease risk and the culture of collaboration and coordination that led to the creation of the ReacTing consortium by Inserm in 2013, in response to the emergence of Chikungunya in the West Indies, then engaged in work on different epidemics: Zika, plague, Ebola…, demonstrate the potential and legitimacy of our institute playing a coordination role in times of crisis. This multi-agency consortium proved essential during the crisis, particularly in order to quickly identify priority research themes, prioritise calls for projects from the ANR and PHRC, support the emergence of partnership projects, mobilise existing or new infrastructures, in particular cohorts, and inform all public decision-making. Its merger with the ANRS under the auspices of Inserm strengthens a field of research on global issues and in which France has a great history, past and still to be written. In addition to its positioning as the sole public body covering the entire continuum of health research, the scope covered by Inserm allows the State to potentially better prepare for health crisis management. Whether dealing with an epidemic, exposure to a poison, a heatwave, Inserm has a special role to play in coordinating the prioritization and monitoring of health research.

The ability to set up major national trials and to activate European financing, as Inserm was one of the few stakeholders to do during the crisis linked to COVID-19, based on the audit's data, should also be the selection criteria for defining a leader. The creation of the CAPNET, whose missions are transferred to the ANRS-MIE, for the current crisis, is a first step. Inserm is responsible for demonstrating its effectiveness for the benefit of all and testing this model in preparation for other crises.

Removing administrative rigidities

Finally, the audit points to administrative rigidities such as the failure of a "funding circuit allowing EPSTs (…), carrying out research on human health but which are not healthcare organisations, to benefit from PHRCs without having to enter into an emergency agreement with the CHUs (…)". It is a challenge for Inserm, which is a coordinator of national, multi-centre trials, not to have a direct funding channel with the MSS (which is its governing body) in clinical research. Discussions are underway in the specific field of emerging infectious diseases with the MSS and ANRS-MIE. In terms of public procurement, the Court also notes that operators are under-utilizing the Order of 25 March 2020. This sentiment is not shared by Inserm. The institute has used it several times in varied ways ranging from ordering masks, Elisa dosage kits, contracts related to

the Discovery trial, to the acquisition of a cytometer. Inserm was able to activate it whenever necessary. These regulatory changes have been very appreciable, as has the fast track put in place by the MSS, in order to reduce the time frames for opinions issued by the Ethics Committees [Comités de protection des personnes (CPPs)], which are essential to the launch of clinical research projects. The experience of the crisis as such has shown that other processes are possible without altering the final quality of decisions.

In conclusion, there are no big countries without strong biomedical and public health research. First, this meets the expectations of patients and society in general, but it is also an economic and sovereignty issue amid tough international competition. Not being at the forefront means being exposed to living tomorrow with the solutions thought up by others, with ethics, values or economic ramifications that will not be ours. It's about taking the risk of not being ready when the moment comes. The post-crisis period is the time to rethink our organisations, and reports such as this invite us to do so.

Inserm is ready to take its full place in this reflection and the implementation of the new guidelines that could result from it, as it has already begun to do through the above-mentioned initiatives and through the ambitious proposals that the Institute is carrying out as part of the negotiation of its future objectives contract covering the 2021-2025 period.

RESPONSE FROM THE CHIEF EXECUTIVE OFFICER OF THE PASTEUR INSTITUTE

We confirm the accuracy of the financial data presented in the table below. These are the financial resources mobilised by the Pasteur Institute in 2020, that is, consumed during the financial year.

Table 6: pasteur Institute Paris funding for research during the period of health crisis

Pasteur Institute Paris	
Type of financing	**Amount in € million**
Public financing	€5.7 million
Donations and patronage	€8.1 million
Own resources	€12.1 million
Other financing	€4.3 million
Total	**€30.2 million**

Source: Court of Accounts based on Pasteur Institute Paris data

We note that in the €5.7 million of public financing, €4.6 million is routed to the International Network of Pasteur Institutes (RIIP) and relates to funds from the AFD, the European Union and the MEAE. In particular, the latter provided €2 million in financing for the REPAIR project (link).

We also note that the Pasteur Institute Paris received €4.8 million from the AFD (financing obtained and not necessarily consumed over the financial year) in 2020.

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RESPONSE OF THE CHAIRMAN OF THE REGIONAL COUNCIL OF HAUTS-DE-FRANCE

As an extension of the letter you sent me, to which extracts from the report of observations referred to in the subject were attached, please find below the comments that this document elicits from me.

In terms of the implementation of the dedicated regional research policy, the Region was contacted from the beginning of the health crisis and organised to support research projects carried out and coordinated by Institutions (research-clinical) in our territory. In fact, the regional research teams have mobilised around the search for new therapeutic solutions to counter the emerging SARS-CoV2 virus responsible for COVID-19. The Hauts-de-France Region supported 11 health biology projects with a total of more than €2 million.

Summary of research projects supported by the Region (research policy) related to COVID-19

Project	Sponsor	Amount	Mechanism
CritiSARS2 - Identification of new viral, inflammatory and immune markers of critical forms of COVID-19	*Lille CHU* *I-Site*	*€199,600*	*Outside of the mechanism*
FlavoCOV - Isolated flavones of halophyte plants and synthetic analogues to combat SARS-CoV-2	*I-SITE*	*€198,180*	*Outside of the mechanism*
THERAPIDE - Innovative COVID-19 Therapy	*IPL*	*€784,982*	*Outside of the mechanism*
COV-NI - COVID-19 treatment: Study on the effectiveness and safety of adding Interferon Beta 1b to lopinavir/ritonavir	*CHU Amiens*	*128,976*	*Outside of the mechanism*
COVID19BC - Clinical, biological and evolving profile of patients hospitalised for COVID-19 at Amiens Picardie University Hospital	*CHU Amiens*	*€72,050*	*Outside of the mechanism*
CORDIAL Flu - Portable diagnostic device to differentiate influenza virus from COVID-19	*CNRS*	*€145,166*	*Resilience CFP*
ODEFRANCE - Optimisation of required and accessible manufactures made necessary by a major health crisis	*Lille CHU*	*€151,020*	*Resilience CFP*
ASSERVIR - A therapeutic alternative to vaccination to combat SARS CoV2 viral infections	*CNRS*	*€96,500*	*Start-AIRR*
DiagnoTerra - TeraHertz Diagnosis of Pathologies by Expired Air Study	*CNRS*	*€99,136*	*Start-AIRR*

SENTICOV - sequencing the SARS-CoV2 virus for the mapping and characterization of SARS-CoV-2 variants circulating in the Hauts de France Region	*EGID* *IPL*	*€76,016*	*Outside of the mechanism*
BACOVID - Development of sprays, based on bacteria, to combat respiratory viruses such as SARS-COV-2	*U Lille*	*€96,360*	*Start-AIRR*
		€2,047,986	

Focus on a few flagship projects:

- *Pasteur Institute Lille: aid of €784,982 for the THERAPIDE project - this project finances innovative COVID-19 therapy. This involves searching for a drug that can be used from the first symptoms of COVID-19 in order to avoid evolution towards serious forms and limit the time during which an individual can transmit the infection.*
- *Amiens CHU: support of €201,026 for 2 projects:*

-COVID19BC on the clinical, biological and evolving profile of patients hospitalised for COVID-19;

-COV-NI: Treatment of COVID-19 via a study on the effectiveness and safety of adding nebulization of Interferon Beta 1b to Liponavir/Ritonavir.

- *As part of the beginnings of a major partnership between the Region and the National Research Agency (ANR), which was subsequently finalised at the end of 2020, it was decided to support two projects registered on the additional list of the ANR Flash COVID-19 call for projects, by expanding the emergency plan put in place by the I-SITE of the University of Lille Nord Europe (I-SITE ULNE) as part of the "Task Force". This aid, in the amount of €397,780, supported two projects:*

-CritiSARS2 of the Lille CHU: identification of new viral, inflammatory and immunity markers for the critical forms of COVID-19;

-FlavoCOV project of the Institut Pasteur de Lille: use of isolated flavones of halophyte plants and synthetic analogues to combat SARS-CoV-2.

- *First implementation of the ANR-Region Hauts-de-France protocol validated in October 2020: the call for ANR-Region Resilience projects in Hauts-de-France allowed the region and the ANR each to allocate €1 million alongside the State and to adopt 15 selected projects (Total allocated to the selected projects: €1.75 million).*

***Call for Projects "Resilience Hauts de France"* 2020**

List of selected projects (in alphabetical order):

Acronym	***Project title***
AGEPIL	Improvement of the quantitative management of groundwater through control of the water table
AUDESSA	Impact of the massive increase of the use of disinfectants on anthropogenic aquatic ecosystems during pandemic periods (AUDESSA)
BIOLANT	Functionalised polysaccharide as a polymer binder for negative Li-ion battery electrodes
CorDial-FLU	Portable diagnostic device to differentiate the virus from COVID-19
COV-EHP	COVID crisis in EHPADs
GreenAct	Controlling the energy consumption of resilient cloud services
Isorédu	Résiliente et Durable Solidaire Informatique [Resilient and Sustainable Solidarity-based IT]
MASCOFIL	Development of a high-quality alternative mask for the general public dedicated to the fight against pandemics, one that is comfortable, washable, with high-performance filtration and manufactured on automatic machines
MURDASP	For sustainable mobility adapted to a pandemic environment
NEOSOILID-R	New solidarity and resilience through times of crisis
Odefrance	Optimisation of required and accessible manufacturings made necessary by a major health crisis
RecyBat-Li	End-of-life Lithium battery stock: a mine of materials for recycled electrodes

As part of the implementation of regional health and research policies, funding for the Senticov Hauts de France research project should be noted: a regional project sequencing the SARS-CoV2 virus for the mapping and characterization of SARS-CoV-2 variants circulating in the Hauts-de-France region, it is carried out by the Institut Pasteur de Lille.

The SentiCov project aims to quickly establish the sequencing of the SARS-CoV2 virus at the regional level. Its implementation is based on the creation of a regional operational network called Senticov Hauts de France, which will have the task of setting up the iterative sequencing (every week for at least two months) of viral genomes, in order to allow close monitoring of the spread of the various viral strains present in the Region, and to assist the authorities in controlling the pandemic. The study will be based on a "random" collection of samples of nasopharyngeneal samples of people identified as positive for COVID-19 through PCR testing by city and hospital medical biology laboratories. The SARS-Cov-2 virus sequencing protocol is in place on the LIGAN high-speed sequencing platform at the Lille LIGAN genomic centre located at the European Institute of Diabetes Genomics (EGID). The Pasteur Institute Lille is the sponsor of this project.

The Region participated in 60.32% of the total cost of this study initiative, which is €252,029. The Region's participation is €152,032 (50% research policy, 50% health policy).

In addition to the implementation of the regional actions described above, it is also important to emphasise that, in addition to supporting public research, the Hauts-de-France Region has also itself invested for students in order to combat COVID-19:

- Distribution of a mask per student via their reporting institution for the 2020-2021 academic year;

- Adaptation of the MERMOZ system (support for international mobility) heavily impacted by the crisis with the slowdown or sometimes the sudden halt of stays abroad;

- Supplementation of two schemes directly intended for students through regional student contracts (+ 60%) and Students Relais Santé (matching), with the challenge of responding to student poverty by providing additional income, provide institutions with additional health bridge student contracts to boost initiatives to prevent drop-out, combat isolation, prevent COVID and provide care;

- Breakdown of catering aid in partnership with the 2 CROUS Lille and Amiens;

- Regional aid of €17 million in the mobilisation and compensation of trainee nurses and student caregivers (Aide MIAS) who were deployed during the height of the crisis in hospital services and medical-social institutions.

Within the scope of the health policy, commitments can be highlighted:

- Participation in financing training for anti-covid mediators

As part of the roll-out of the Tester Alerter Protéger strategy, the Government has decided to strengthen the capacity of the Regional Health Agencies to perform collective screenings, in addition to the mobilisation of independent health professionals (laboratories, pharmacies, nurses and independent nurses). These initiatives consist in developing more targeted screening for the situations and populations at risk. To this end, a training course was begun for anti-COVID-19 mediators.

In order to roll out this system, the region assisted the Hauts-de-France Regional Health Agency in financing the training of anti-covid mediators carried out by the Institutes of Training in Nursing Care (IFSI).

The national target of 12,000 mediators trained by March gives a target of 1,070 people trained for the Hauts-de-France region.

As such, the Hauts-de-France Region financed 50% of the training courses carried out by the Nursing Training Institutes (IFSI). The Region's participation in the training system for these anti-covid mediators amounted to €40,125.

- Participation in the financing of an experiment with the Science Po Lille inclusivity programme: cognitive disorders and training for the University of Lille

Cognitive disorders are the primary cause of academic drop-out and truancy, at all ages, and therefore the first cause of school failure, with the social and economic consequences that this implies. The health crisis leading to alternative educational methods is intensifying learning difficulties that require specific handling.

That is why the Region wanted to support Science Po Lille in an experiment that this institution conducts in terms of inclusive training and prevention in terms of the mental health of CFA students.

The objective of this experiment is to conduct a wide-ranging awareness-raising, skills development and resource allocation initiative on cognitive disorders among a broad audience of teachers from the higher and initial training organisations in the region aimed at transforming educational practices as part of an innovation and universal inclusivity approach. This initiative,

initially carried out in partnership with the University of Lille and the University of Polytechnique Hauts-de-France, is expected to grow throughout the region for the benefit of all higher education stakeholders.

As such, the Hauts-de-France Region financed 50% of this experiment. The Region's participation is €25,500.

RESPONSE OF THE CHAIRMAN OF THE REGIONAL COUNCIL OF GRAND EST

You wished to bring to my attention the excerpts of the audit entitled "The funding of public research in the fight against the COVID-19 pandemic" and I thank you for doing so.

I have carefully read this document and, in response, would like to provide you with some information in relation to the "Grand Est Resilience" call for projects.

Background information

Faced with the COVID-19 pandemic, and in addition to emergency interventions aimed initially at the economy, the Grand Est Region decided, from April 2020, to mobilise the scientific community to respond to the challenges of the health crisis and assist public stakeholders in decision-making in the face of future changes.

The scope of a call for projects was then defined by the Region, which, very quickly, following informal contacts between the offices of the President of the Region and the Minister Frédérique VIDAL, partnered with the National Research Agency (ANR), mandated by the Ministry of Higher Education and Research (MESRI), to formalise the partnership.

This association then resulted in a common definition of the specifications of the initiative between the "Higher Education Research Transfer" department of the Region and the ANR, as well as the precise framework (launch date, targets, duration of projects, expected budgets, method of selection, etc.) of the call for projects for a shared initiative "Grand Est Resilience" intended to learn all lessons for the region from the current health crisis through the mobilisation of scientific research.

The ANR, for the MESRI, and the Grand Est Region (RGE) then met to create this call for projects, the initiative for which returned to the Region, a tool for assessing the territorial impact in the Grand Est of the COVID-19 pandemic on the economy, society and the environment, and for supporting decision-makers in the evolution of development systems.

This CFP should also encourage collaborations between communities and the various academic laboratories in the Grand Est to speed up the implementation of solutions to prepare organisations to cope with these forms of crisis and develop more resilient territories.

As part of the discussions/validations between the Grand Est Region and the ANR, the two partners have defined a joint allocation to support projects of €2 million, with shared financing for the MESRI/Grand Est region (€1 million Region and €1 million State, managed by the ANR operator).

Implementation

The call for projects was published on 7 May 2020 and closed on 4 June 2020.

The call was addressed to research organisations and public research institutions in the Grand Est, as well as the consortiums made up of academic and private stakeholders, with this dissemination being carried out by the departments of the Region.

Despite a very short deadline left to the institutions, 72 project proposals were submitted. After studying the eligibility of the files by the Region's departments, these proposals were each sent to the ANR, in accordance with their own internal procedure, to conduct the evaluation.

This was carried out scientifically by two experts for each case, mandated by the ANR, organised around five main themes: Biology/Health, Digital/Mathematics, Humanities and Social Sciences, Biological Resources and Physical Sciences/ Engineering/Chemicals/Energy).

In this context, the Region's departments were able to participate in the evaluation commissions in early June, involving the experts and evaluators of the ANR.

After transmission of evaluation reports by the ANR, the Grand Est Region organised on 17 June 2020, the presentation of dossiers and evaluations to a regional jury, chaired by the Grand Est Region / Grand Est Local Education Authority, including the ANR and made up of players from the ESRI (CRT, academic institutions, SATT…) of the Grand Est region.

The jury selected an initial list of 34 projects submitted to the State-Region Restricted Selection Committee. Based on the scientific assessments and evaluations carried out by the members of the jury, the Selection Committee (State, Local Education Authority, ANR) then selected ***15 winning projects for a total amount of €1,989,495, of which: €325,639 in investment and €1,663,856 in operation, distributed with State/Region parity. This choice was made on the basis of regional priorities.***

Among the winners, the domains are represented as follows:

• Biology/Health: two projects;

• Digital / Mathematics: three projects;

• Physical sciences, Engineering, Chemicals, Energy: two projects;

• Ecology, Environment, Biological Resources: two projects;

• Humanities and Social Sciences: six projects.

These winning projects have the following scientific coordinators:

• Unistra and University of Lorraine: three projects each;

• UTT and University of Haute Alsace: two projects each;

• IHU Strasbourg, URCA, CNRS Alsace, École d'Architecture de Nancy, CHRU de Nancy: one project each.

<u>Review of this partnership</u>

• An unprecedented partnership for the Grand Est/State region (in several of its components MESRI, Local Education Authority, ANR) to respond to a crisis situation, which gives the scientific community the image of public stakeholders working in a coherent and effective manner to quickly approve support (less than 3 months between the launch of the initiative and the decision);

• Support doubled with significant leverage, thanks to the contribution of the MESRI in addition to the initial budget deployed urgently by the Grand Est Region. From the beginning, for the sake of simplification, this budget has been mobilised equally on all winning projects;

• The ability of the ANR to undertake the evaluation work, even before any official decision of the Grand Est Region, to remunerate the Agency for the expertise carried out;

• A recognised ANR evaluation process that it has been possible able to implement very quickly and provide representatives of the Grand Est Region with essential decision-making/selection information for projects. These very favourable conditions for the implementation of the ANR/Grand Est Region partnership resulted in an agreement in 2021, between the two partners, to establish a procedure for the evaluation of projects of industry chairs and state-of-the-art regional infrastructure;

• The establishment of a joint ANR/Grand Est Project Financing Agreement, streamlining project financing procedures for sponsors but it proved impossible to build a single financing fund within the required timeframe;

• Post facto and follow-up project evaluation work should be organised later this year in order to find out the results of the research and determine the impact it has had (economic, social, public, health, etc.).
