Evaluation of research institutions

EVALUATION REPORT OF THE NATIONAL INSTITUTE FOR HEALTH AND MEDICAL RESEARCH (INSERM)

May 2021

High Council for evaluation of research and higher education

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Under the decree No.2014-1365 dated 14 November 2014,

[1] The president of HCERES "countersigns the evaluation reports set up by the experts committees and signed by their chairman." (Article 8, paragraph 5);

[2] The evaluation reports "are signed by the chairman of the experts committee". (Article 11, paragraph 2).

Executive summary

INSERM is a French research organization placed under the supervision of the Ministry of Higher Education, Research and Innovation and the Ministry of Solidarity and Health. Its staff is made up of 5,110 civil servants (2 156 researchers and 2 954 engineers, technicians and administrative staff (ITA)) and 3 106 workers with open-end or finite term contracts. In addition, 5 242 university hospitals practitioners and universities staff are affiliated to INSERM units but are employed by their organisation. These units are made up of 261 joint units – shared with universities, other research organizations such as CNRS, and university hospitals (CHUs) –, 36 service units and 34 clinical investigation centres. INSERM budget is €966 million including 65% of public funding and 35% of own resources.

The review panel, after having read the self-assessment report (SAR) and interviewed 121 people in 39 interviews over 3 days, could draw a number of conclusions and propose 30 recommendations to INSERM, including nine major ones.

The main features of the committee's report can be summarized as follows:

The committee noted that the management of INSERM is efficient and well performed. The committee proposes to improve governance processes by organizing staggered terms of appointment for members of the scientific council in order to ensure continuity of actions and by encouraging the participation of researchers. The committee noted room for improvement in strategic planning with the Ministry of Health to develop a long-term public health strategy, and welcomed the positive dynamic initiated during the Covid crisis. In addition, annual funding makes programming over five years difficult. The committee praised the many partnerships at European and international level.

INSERM's missions concerning fundamental research and clinical research, which is expressed through specific recruitments, are perfectly handled. Despite everything, its action for public health is relatively weak, essentially carried out by a few flagship projects and is detrimental to overall action in health. The role of INSERM as a research funding agency could increase. The role of AVIESAN did not seem obvious to the committee, which suggested that the ministries specify it. A one-stop-shop with the relevant partners could be created to participate in European research infrastructures.

The committee encourages INSERM to develop more interdisciplinary research through a stronger association with CNRS. Joint units provide universities with a quality label, particularly with an enhanced attractiveness for PhD students. Links with CHUs could be strengthened, for example in the management of patient cohorts.

Concerning staff, the committee proposes that researchers be encouraged to participate more strongly in teaching and that their participation in collective activities be included in the promotion criteria. The valuation of ITA activities should be stronger. The committee recommends actions to attract a greater number of young talents in both fundamental and clinical research and to improve internal communication, particularly on INSERM evaluations. The low attractiveness of recruiting medical doctors by INSERM is due to low salaries offered. It is a major obstacle for increasing a wider coverage of INSERM's actions in public health. It also recommends more training in management methods for joint unit heads.

The transfer of research activities to companies is reflected in a large number of patents and the creation of start-ups in the pharmaceutical and medical fields. The committee also noted that INSERM's links were more effective with SMEs than with large pharmaceutical companies, and that there was room for progress in the cooperation of researchers with those companies. The committee also encourages INSERM and the ministries to clarify the distribution of tasks between SATT and INSERM-Transfert. The use of specific tools is proposed by the committee to support researchers in the development process.

Résumé

L'INSERM est un organisme de recherche français placé sous la double tutelle du ministère de l'Enseignement supérieur, de la Recherche et de l'Innovation et du ministère des Solidarités et de la Santé. Son personnel regroupe 5 110 fonctionnaires (2 156 chercheurs et 2 954 ingénieurs, techniciens et membres du personnel administratif (ITA)) ainsi que 3 106 contractuels et vacataires. En plus de ceux-ci, 5 242 universitaires et praticiens des centres hospitaliers universitaires sont affiliés à des unités de l'INSERM, tout en restant employés par leurs propres organisations. Ces unités sont organisées en 261 unités mixtes de recherche (en partenariat avec des universités, des organismes de recherche tels que le CNRS et des centres hospitaliers universitaires (CHU)), 36 unités de service et 34 centres d'investigation clinique. Le budget de l'INSERM est de 966 millions d'euros. Il est composé à 65 % de fonds publics et à 35 % de ressources propres.

Le comité d'experts, ayant pris connaissance du rapport d'autoévaluation (RAE) et s'étant entretenu avec 121 personnes dans le cadre de 39 réunions réalisées sur 3 jours, est en mesure de formuler un certain nombre de conclusions et de proposer 30 recommandations à l'INSERM, dont neuf recommandations principales.

Les points clés du rapport du comité peuvent être résumés de la façon suivante :

Le comité constate que la gestion de l'INSERM est efficace et bien exécutée. Le comité propose d'améliorer les processus de gouvernance en favorisant la participation des chercheurs et en instaurant des mandats décalés pour les membres du Conseil scientifique afin d'assurer la continuité des activités. Le comité constate que la planification stratégique avec le ministère de la Santé pourrait être améliorée afin de développer une stratégie de santé publique à long terme. Il salue la dynamique positive qui s'est mise en place pendant la crise de la COVID. En outre, le cycle annuel du financement rend difficile l'établissement d'un programme quinquennal. Le comité salue également les nombreux partenariats aux niveaux européen et international.

Les missions de l'INSERM en matière de recherche fondamentale et clinique, qui s'expriment par des recrutements spécifiques, jouissent d'une gestion parfaite. En dépit de tous ces efforts, l'impact de l'INSERM sur la santé publique est relativement faible, avec seul un petit nombre de projets phares utiles dans ce domaine et une approche qui ne favorise son impact global sur la santé. Le rôle de l'INSERM en tant qu'établissement de financement de la recherche mériterait d'être développé. Le rôle de l'*Alliance nationale pour les sciences de la vie et la santé* (AVIESAN) n'apparaît pas évident aux yeux du comité, qui suggère aux ministères de le clarifier. Un « guichet unique » pourrait être créé avec les partenaires compétents afin de participer aux infrastructures de recherche européennes.

Le comité encourage l'INSERM à développer davantage la recherche interdisciplinaire en consolidant son partenariat avec le CNRS. Les unités mixtes permettent aux universités de bénéficier d'un label de qualité et augmentent notamment leur attractivité auprès des doctorants. Les liens avec les CHU pourraient être renforcés, par exemple au niveau de la gestion des cohortes de patients.

S'agissant du personnel, le comité suggère d'une part, d'inciter les chercheurs à s'impliquer davantage dans l'enseignement, et d'autre part, d'inclure leur participation à des activités collectives dans les critères de promotion. Les activités du personnel ITA devraient être mieux valorisées. Le comité recommande de prendre des mesures pour attirer davantage de jeunes talents, à la fois dans la recherche fondamentale et dans la recherche clinique. Il recommande d'améliorer la communication interne, en particulier concernant les évaluations de l'INSERM. Le peu d'attractivité de l'INSERM pour le recrutement des docteurs en médecine s'explique par la médiocrité des salaires proposés. C'est un obstacle majeur à l'élargissement du champ d'action de l'INSERM dans la santé publique. Le comité recommande également de proposer une meilleure formation aux méthodes de gestion aux directeurs des unités mixtes.

Le transfert des activités de recherche aux entreprises donne lieu à un grand nombre de brevets et à la création de start-ups dans les domaines pharmaceutique et médical. Le comité constate également que les partenariats de l'INSERM sont plus fructueux avec les PME qu'avec les grandes entreprises du secteur pharmaceutique et que la coopération entre les chercheurs et ces entreprises pourrait être améliorée. Le comité invite également l'INSERM et les ministères français à clarifier la répartition des tâches entre les SATT et INSERM Transfert. Le comité suggère de recourir à des outils spécifiques pour soutenir les chercheurs dans le cadre du processus d'innovation.

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Introduction

1 / Presentation of INSERM

INSERM is a French public research institution (*établissement public à caractère scientifique et technologique*) headquartered in Paris. It was founded in 1964 and is ruled by decree n°83-975 of 10 november 1983.

INSERM is placed under the joint authority of the Ministry in charge of research (currently Ministry of Higher Education, Research and Innovation) and the Ministry in charge of health (currently Ministry of Solidarity and Health). Both Ministries signed an objectives and performance contract with INSERM for 2016-2020. This contract will be renewed for 2021-2025.

INSERM's missions are the followings:

- to initiate, develop and coordinate biomedical research of excellence;
- to create value from discoveries and their applications;
- to provide scientific expertise and support for science based policy in health;
- to produce and disseminate knowledge nationally and internationally;
- to support higher education and research training;
- to play a leading role in the national coordination of health research.

INSERM's fields of activity and expertise cover fundamental and translational research, clinical and preclinical trials, cohorts and epidemiological studies, expertise for public health and research policy, technology transfer, and biomedical research infrastructure.

These activities are structured in 9 thematic institutes: Molecular and structural basis of life sciences; Cell biology, development and evolution; Genetics, genomics and bioinformatics; Neurosciences, cognitive sciences, neurology and psychiatry; Cancer; Immunology, inflammation, infectiology and microbiology; Physiopathology, metabolism, nutrition; Public health; Health technologies.

INSERM operates 261 research units, 36 service units, and 34 clinical investigations centres. These research units are shared with:

- Universities, which employ lecturers and professors (MCU[1] and PU[2]);
- Research organisations such as CNRS, which employ researchers (CR[3] and DR[4]) and engineers, technicians and administrative staff (ITA[5]);
- University hospitals (CHU[6]), which employ hospital practitioners (PH[7]) and university hospital practitioners (MCU-PH and PU-PH[8]);
- Foundations, such as *Institut Pasteur*.

As of 2020, INSERM staff is made up of 5 110 civil servants (2 156 researchers and 2 954 ITA) and 3 106 workers with open-end or finite term contracts. In addition, 5 242 university hospitals practitioners and universities staff are affiliated to INSERM units but are employed by their organisation.

INSERM budget is €966 million, including 65% of public funding and 35% of own resources.

INSERM published ~44 000 original peer-reviewed articles during the 2015-2019 period and runs a portfolio of 1 913 patent families[9].

INSERM-Transfert, as a private subsidiary of INSERM, manages economic and societal value creation and the transfer of knowledge from INSERM joint units to companies.

[1] *Maître de conférences des universités.*
[2] *Professeur des universités.*
[3] *Chargé de recherche.*
[4] *Directeur de recherche.*
[5] *Ingénieur, technicien et administratif.*
[6] *Centre hospitalier universitaire.*
[7] *Praticien hospitalier.*
[8] *Maître de conférences des universités – Praticien hospitalier / Professeur des universités – Praticien hospitalier.* These status allow their beneficiaries to receive a double salary from both the hospital and the university.
[9] Source: Key figures 2016-2019 (Annex to the SAR).

Since 2009, INSERM is a member of the French National Alliance for Life Sciences and Health (AVIESAN), which groups together the main stakeholders of life and health sciences in France (in particular CNRS, Universities, INRAE, INRIA, *Institut Pasteur* and IRD). AVIESAN is chaired by the Chairman and CEO of INSERM.

2 / Context of the evaluation

This evaluation focuses on the 2016-2020 period. The self-assessment report (SAR) has been written by INSERM according to the HCERES standards for external evaluation of research organisations.

The previous evaluation of INSERM was carried out in 2015 by an international review panel.

The committee has taken into account expectations of INSERM, of the Ministry of Solidarity and Health, and of the Ministry of Higher Education, Research and Innovation. The committee has linked these expectations together with the following axis:

- Understanding INSERM in context: relationship with government, other funders, and the research community.
- How does INSERM establish research priorities?
- INSERM governance and management.
- INSERM support for talent: assessment, recruitment, retention, career development.
- Valorisation strategy: incentive, start-ups, private/public partnerships.
- Communication with all INSERM stakeholders.

INSERM provided a self-assessment report 2016-2020 together with additional documents presenting the organization and indicators of the activities of the institution, and accompanied by the 2025 strategic plan. The self-assessment report is clearly written and presented as a conclusion a clear self-assessment panel identifying INSERM's strength and weakness.

Positioning and strategy

1 / Positioning and missions

INSERM is the only French research organisation that covers the whole of medical sciences, health and biology. It is one of the leading European institutions and is similar to the US National Institutes of Health in terms of such activity. It is the only French institution that covers biomedical research from fundamental biology to population health, through clinical and medical developments.

One of the major challenges, apart from financial constraints, facing INSERM is competition amongst research institutions to claim leadership in health research, particularly universities and research organizations. While empowering local research activity is important, the national vision and coordination provided by INSERM is essential for France's ambitions in medical and health research. There is also a concern that citizens appear to be losing trust in science, which has been exacerbated by TV appearances of researchers during the COVID-19 crisis.

As a consequence of this positioning, INSERM has an expert and government advisory role. This position is clearly stated in the SAR and strongly reaffirmed in the 2025 strategic plan. The committee agrees with this unquestionable positioning. Nevertheless, INSERM is facing challenges generated by the recent evolution of medical science and major changes in political development of the research landscape in France. It is obvious to the committee that INSERM has a clear view on its necessary evolution.

Medical research must now be addressed through multidisciplinary approaches including computational medicine, big data management, mathematical modelling, and innovative technologies.

The institution cannot cover all these fields on its own and has to strengthen existing collaborations with other French institutions such as CNRS and INRIA.

Human health has now to be addressed via a global approach including animal health, environment and social changes. According to the INSERM CEO, a One Health program for infectious diseases is now on the road map. Global health, including all disease areas, is under consideration.

These approaches will require close interactions with other French agencies devoted to environment and animal health, such as INRAE, IRD and CIRAD.

INSERM has to adapt its positioning and strategy to the growing role of universities in performing science. Some of these partners have a high level of strategic autonomy and pivotal roles in the development of local research and higher education centres all over France. The Ministry of Higher Education, Research and Innovation is clearly pushing research organisations, and especially INSERM, to help universities in this restructuring of research in France. The aim of the 2025 strategic plan to create "project teams" with other institutions, based on temporary mixing of people from different scientific fields to facilitate cross-disciplinary approaches, is a great innovation.

INSERM, like several French research organisations, has to play a dual role as a research operator and as a provider of means. Some INSERM employees consider that there is a major risk that INSERM loses its influence over joint units that are jointly supervised and then simply becomes a funding agency to the profit of universities. The CEO considers that INSERM will retain a major influence as it is overall the main employer with highly qualified staff in all its joint units, and the INSERM label gives access to participation in great European projects. Even so, INSERM clearly sees itself in a dual position as a unique operator of nationwide health programs and national health platforms and as a partner in local research structures.

The committee considers that INSERM has a clear view on its dual positioning and on its overall missions within the French biomedical research landscape.

One area of concern during the review was the nature of the interactions between INSERM and the health ministry, although the COVID-19 crisis has shown a strengthening of interactions as a promising step to further years of sustainable interactions. The Ministry of Research has daily contact with the ministry of health but at a low level. The Directorate General of Research & Innovation (DGRI) at the Ministry of Higher Education, Research & Innovation has had little contact with the Directorate General of Health at the Ministry of Solidarity and Health, mainly because of COVID-19. The €50 million funds released for COVID-19 were spent on a FLASH call for projects (short-term projects) with a rapid response committee. ANR ran the FLASH call, the open call was run *via* ANRS, which was originally set up for AIDS, while the INSERM funding was spent mainly in Africa. The Ministry of research was satisfied with INSERM's plan last year but INSERM now needs to prepare for the 5 year contract and the

Ministry would like to see some change in light of the pandemic. Issues discussed by the committee related to open science, open data, citizens criticism of scientists, lack of trust in scientists – seeing scientists disagreeing in the media has eroded trust.
The committee could not meet any representative from the Ministry of Solidarity and Health, but a document summarizing the main lines of relations between the Ministry and INSERM was sent by the Directorate General of Health.

2 / Institutional strategy

Currently, INSERM's strategic priorities are developed bottom up, then agreed by the Board and then discussed with the ministries. This inclusive approach was supported by all interviewed parties. In addition, INSERM receives some additional specific orders from the Ministry of Health.

The Scientific Council currently has input into INSERM's strategic priorities. The CEO has recently created a new Directorate of Strategy. Its aims are to improve INSERM organisation, prepare the next strategic plan, develop methodologies and cross-cutting views across different programmatic actions, facilitate interaction with the government, and finding means of strategy implementation. This role should not replace thematic institutes' objectives. The Directorate of Strategy has already established connections with the HR department, the evaluation department and the communication department, but not yet with the Scientific Council.

It is currently unclear if the new Director of Strategy intends to continue the same inclusive approach to developing INSERM strategy. Other parties are concerned that this might not be the case. The Directorate of Strategy has good existing links with the Ministries, and INSERM would benefit from using this new Directorate to strengthen its relationship with the Ministries.

3 / Strategy of alliances and partnerships at local, national and international levels

a/ National alliances and partnerships

INSERM as a national research organization has built a large number of alliances with universities and other research organizations, notably through the creation of joint units. They emphasise the importance of the relationship with INSERM senior management, and most of the joint activities depend on the willingness of INSERM CEO to consider them as an equal partner.

<u>Universities</u>
INSERM has a constructive partnership with universities under joint units. INSERM offers secure, high level positions and brings added value that could not be brought by universities if they were the sole party that performs research.

Universities appreciate the recent decision of INSERM to appoint single points of contact at the local level within INSERM for universities. INSERM is seen as a quality label and can facilitate integration of national and local vision. Assessment and management of INSERM researchers is impressive as it differs from some local university practices that do not involve individual assessment and place a heavier weight on teaching than scientific research. Partnership between universities and national research organizations facilitates close coordination between site policy and national/international issues. One of the most valued contributions of INSERM is its support staff (ITA). Technical platforms can only work thanks to the ITAs. Universities have their own support staff, but they tend to favor teaching researchers when defining their HR policy.

However, there are clearly tensions in the relationship between INSERM and universities. Some people that the committee interviewed think that INSERM feels threatened by the proposal to give universities leadership of local research strategy. Universities would like to be recognised as equal to INSERM in terms of the national research agenda. There is a true recognition from INSERM's CEO that the different roles and responsibilities of INSERM's researchers and universities' teachers-researchers should converge. Teaching has to be seen as an important component of the day-to-day contribution of a researcher and can enhance research outputs. Universities and national research organizations do not currently run hiring campaigns at the same time during the year, which limits the ability to develop a joint strategy.

In discussions related to change in joint units perimeters, universities need to be involved in decision making at a local level. On the issue of researchers' mobility, dynamic researchers can move between joint units while weaker researchers tend to settle within a specific unit. In relationships with the universities, it is important to accommodate variation in the local ecosystem.

CHUs

The committee met MCU-PH and PU-PH in charge of the CHU infrastructures in Paris and Regions. They appreciate the relationship between INSERM and the CHUs, but complain about the attitude of INSERM as the dominant leader with a governance model that is too centralized. They request more recognition of CHU managers in the governance and strategy of the research programs conducted in CHUs. In their mind, INSERM is often behaving as a competitor and this leads to a loss of energy in conducting research programs. They ask INSERM for better recognition of the capacity of CHUs to take initiatives and feel that INSERM should not consider a CHU just as a clinical research organisation (CRO). For example, CHUs should be more involved in the governance of joint units.

University medical professors (PU-PH) who are INSERM joint unit directors have influence, but this could be improved, and also freedom within joint units is important. Translational research is not fully understood and valued by scientists, and MDs need to explain its importance. In addition, full-time clinicians (PH) are not sufficiently aware of INSERM.

The committee considers that INSERM should be aware of these feelings and improve the relationships with CHUs.

AVIESAN

The government has created associations bringing together all research operators working in neighbouring fields.[10] Thus the Alliance for Life Sciences and Health (AVIESAN) was born out of the desire to increase the performance of French research, by promoting its consistency, creativity and excellence. This mission calls for scientific coordination of major research themes, transversal to all organizations, and operational coordination of projects, resources and means. An agreement, signed on April 8, 2009, gives concrete form to this Alliance. The chairman of AVIESAN is the Chairman and CEO of INSERM, and the vice-chairman is the INSB director[11].

Over the last few years, it also tackles new challenges like artificial intelligence, management of big data and new technologies for biology. Partners of AVIESAN are CEA, CHUs, CNRS, INRAE, INRIA, INSERM, Institut Pasteur, IRD and Universities. It is composed of 9 Multi-Organisation Thematic Institutes (ITMOs) that are the same as INSERM's thematic institutes. The representatives of INSERM in AVIESAN are the leaders of INSERM's Thematic Institutes. The role of the Alliance is to coordinate strategic analysis, scientific programming and operational implementation of research in life science and health. It should also assist public-policy decision making, adopt a common position in terms of national research and European and international cooperation, and promote innovation and its optimisation through new industrial partnerships.

From the various stakeholders interviewed, the committee could not obtain a unanimous and clear opinion about the efficiency of AVIESAN. The leaders of thematic institutes were clearly supportive. In contrast, some private partners consider AVIESAN is too complex in structure with low added value. The position of the Ministry of Higher Education, Research and Innovation was quite elusive. CNRS considers that in AVIESAN each partner is primarily pushing its own position and the missions are not clear. Some people consider the declining interest of the authority ministry for AVIESAN results from the growing role of universities in managing interdisciplinary and multi organism programs. However, all acknowledge the major role of AVIESAN in promoting French research in life science and health at the European level.

The committee considers the role and future position and mission of AVIESAN should be clearly stated by the government authority to avoid confusion and loss of energy between stakeholders.

CNRS

CNRS values the collaboration with INSERM. They have joint units and research infrastructures. CNRS recognizes the good relationships between the two institutions (which has not been always the case in the past) and fully agrees with the positioning of INSERM and the importance of reinforcing links between both institutions. According to CNRS, the interdisciplinary work with INSERM could be further improved by investing in, for example, joint units where mathematics or computer science (CNRS) and health (INSERM) come together. The CNRS is however opposed to hosting newly recruited CNRS researchers in INSERM units, preferring joint units.

INRAE

INSERM and INRAE share 6 joint units, mostly on human nutrition. INSERM is very keen to invest in gut-microbiome research at a large scale. Furthermore there is a great opportunity for INRAE to join INSERM on the topic of antimicrobial resistance. However, INRAE considers collaboration with INSERM should focus more on preventive medicine and feels that INSERM is too much focused on curative medicine.

[10] https://aviesan.fr/aviesan/accueil/menu-header/missions-realisations.

[11] Institute of Biological Sciences (INSB) of the CNRS.

INRIA

As mentioned above, INSERM is developing new approaches of medicine using computational medicine, big data management, mathematical modelling and artificial intelligence. It is then necessary that it collaborates with INRIA. Unfortunately, the committee could not meet an INRIA representative.

Foundation: the IMAGINE Institute

INSERM is a founding member of the IMAGINE Institute[12], which is the leading European research center for genetic diseases. It gathers around 1 000 research and health staff, 30 % of which are employed by INSERM. **INSERM is encouraged to use the IMAGINE Institute more, e.g. for seminars and to answer specific questions from INSERM**.

General public

Historically, patient organisations have not always been fully recognised as a direct research partner by INSERM. The current INSERM leadership sounds keen to change this position, which is very much a welcome move.

As a single national academic voice on health matters, INSERM has been able to gain public trust, for example in relation to COVID-19, in a way which would be difficult for single universities.

Public / patient involvement (PPI) in research is increasing but still not at the level of some countries. Some units are hosted by patient associations, and patient associations are represented on the INSERM internal management. However, there is no INSERM-wide culture of PPI inclusion in setting research priorities, conducting research and evaluating research. Nevertheless, there are some examples where it is done well, such as the European Joint Program on Rare Diseases[13]. INSERM is a founding partner organisation and currently the lead partner. The program covers research, translation, technical innovation, knowledge transfer and patient resources. Patient organisations are full partners. They are given training in empowerment and engagement, and are involved in all aspects, including governance, shaping research agenda, evaluation, innovation strategy, and prioritisation of involvement with industry.

The patient representatives provided the committee with a SWOT analysis. They were keen to promote participation of patients in shaping the research agenda. In the last 4 years, more than 3 500 people participated in a meeting convened by 30 patient associations, working with 300 researchers and clinicians. 700 people participated in seminars on themes like neurodevelopment and vaccines. Patient groups have performed over 100 reviews of projects.

The "*Groupe de Réflexion avec les Associations de Malades*" (GRAM) receives money raised by patient associations. GRAM does not receive funding from INSERM. Fundraising has not been as bad as expected for some charities, but COVID-19 has had a negative effect on the bigger charities. Patient voices have not been heard in terms of some government decisions during COVID-19, e.g. cancer patients. The patient groups would like INSERM to transmit messages from GRAM to the government. GRAM meets the INSERM CEO once a year and would like to have a more formal relationship.

More needs to be done to place patients at the heart of INSERM's projects and careers. The GRAM wants to extend training and lab open days, and to have a greater role in shaping INSERM strategy. There needs to be formal mechanisms to push researchers to work with patient groups, and PPI should be included in evaluation of researchers. INSERM should create a prize for involvement of patients in the design of research. The GRAM is important in translating messages between patients and researchers and is thinking of developing a charter to cover those relationships. Patient groups should be part of the career journey of young researchers. GRAM is active in establishing contacts with young researchers to help them understand the impact of their work on patients – this is very important as the starting point to help researchers shape their own research.

From these discussions with patients representatives, the committee considers that INSERM should structure better its relationships with patients associations to ensure better outputs and public consideration.

[12] The IMAGINE Institute is supported by a Foundation for Scientific Cooperation created in 2007 by INSERM, AP-HP, Paris Descartes University, Paris City Council, AFM-Téléthon, and CHUs of Paris-CHUs of France Foundation. It was awarded the University CHU Institute (IHU) label in 2011 and the Carnot Institute label in 2020.

[13] Launched in January 2019 with funding of more than €110 million, this program brings together 130 research partnerships, funding agencies, CHUs, patient foundations and associations, from 35 countries. This program aims to better coordinate the various partners' research, pool expertise, and exploit all the resources needed to improve diagnosis and speed up development of treatment strategies. It follows on from the E-Rare program, which was also led by INSERM, between 2006 and 2014 (SAR, p. 42).

b/ International partnerships

International presence and visibility of INSERM is supported at three different levels: creating joint research structures with foreign research agencies, targeted bilateral actions for exchange of information and peoples and developing common programs, and involvement in multilateral European and world authorities (World Health Organisation, United Nations, Heads of International Organizations, Coalition for Epidemic Preparedness Innovations).
The presence of INSERM in the European landscape of research in life sciences is quite strong. Beside its presence in 5 associated laboratories in England and Germany, INSERM is managing numerous European collaborative projects within the frame of Horizon 2020. Since the launch of Horizon 2020 in 2014, the number of these projects has continuously increased, and as of June 2020 more than 430 European projects involve an INSERM team with some flagship projects on rare diseases, bio surveillance and neurogenerative diseases.
INSERM is ranked first in Europe in terms of projects selected and overall funding in the life science domain.
European and international INSERM representatives are working hard to connect researchers to the international market and/or to the EU (European Commission, ERC). They would like to further nudge INSERM researchers to apply more for European calls, and would like to better support researchers in their writing.

The committee acknowledges this strong European activity of INSERM.

Outside Europe, INSERM is supporting 23 international associated laboratories and 2 international research units respectively in Irvine (US) and Heidelberg (Germany). The main presence abroad is in North America where it is managed by a representative in the USA. However, the field of work of this office is quite large (US and Canada) and would require a second person to carry out the mission.

Globally, the rate of international co-publications of INSERM is slightly less than that of France but is increasing during these last 6 years from 48% to 51%[14].

From the point of view of other national research institutes and foundations, INSERM is a key scientific partner at the international level and the committee follows this appreciation.

Governance and management

1 / Internal structure of INSERM and Governance

a/ The CEO and Vice-CEO

The governance of INSERM is the responsibility of the CEO and Vice-CEO. The Vice-CEO is appointed by the CEO, himself appointed directly by the government. Both have a strong scientific background and great experience in managing public institutions devoted to research and higher education.

Other similar French organisations have more than one Vice-CEO. Since INSERM has a narrower focus, it requires only one. In comparison to the CEO, the Vice-CEO is more focused on internal organisational issues and day to day management. The Vice-CEO also provides leadership to the regional institutes. The CEO and the Vice-CEO, within the larger managerial board, make a strong team.

The CEO has overall leadership for the development and delivery of strategy, and the running of the organisation. He chairs a weekly internal board meeting that is largely operational and covers both scientific and administrative matters. He also chairs the Management Board. The current CEO is well appreciated and respected within INSERM and by external organisations.

The Vice-CEO organises monthly meetings with the regional organisations on contracts and resource issues. The Vice CEO is clear on her role and interacts closely with the CEO.

For his strategic and management decisions, the CEO has to deal with both top-down demands from the authority ministries and bottom-up proposals from the joint units and internal scientific structures. This is where the Directorate of Strategy might be crucial. To help the CEO in his mission the Directorate of Strategy should then have close interactions with the scientific structures of INSERM. **The committee recommends that the Directorate of Strategy should further strengthen relationships with the thematic institutes and with the Scientific Council.**

[14] Source: INSERM Key Figures 2016-2020.

b/ The Management board

It is composed of 21 members, among whom 6 are elected staff members, 6 are qualified nominated individuals, 6 representatives of ministries (of whom 4 are representatives of the respective authority ministries), and 3 representatives of research and higher education agencies and institutions. It is renewed every 5 years. The board deliberates on the strategy of the institution, its strategic plan, draft objectives and its general management. It validates the budget proposed by the CEO. The board usually meets quarterly.
The composition of the board is similar to that of other public French research institutions and elected representatives of staff usually complain about their low representation. The staff representatives met by the committee appeared strongly motivated to participate in the activity of the board, and were enthusiastic and proud employees of INSERM.

The Management Board helps the CEO take decisions but seems to be insufficiently rigorous. Board members complain about the short time interval between obtaining files and board sessions. This does not allow them enough time to analyse the documents.

The committee strongly recommends that formal procedures of the Board should be respected to ensure the strong adhesion and participation of all its members.

c/ The Scientific Council

The INSERM Scientific Council's membership is half elected and half nominated. This provides a good mix which is representative of the membership of INSERM. The members have a 5-year tenure; however, they all rotate off at the same time, which can lead to loss of institutional memory.

The committee recommends staggered renewal of the scientific council to have some overlap in the terms of individual appointments, which would provide necessary continuity.

The CEO's decisions are largely based on advice provided by the scientific council. INSERM's strategic priorities are set bottom-up through the scientific council, and then discussed and agreed with the Ministries. The Scientific Council has real input into INSERM's priorities. The President of the Council considers that the present CEO is giving a prominent role to the Scientific Council, but also considers there is room for further improvement.

The Specialized Scientific Committees (SSC) evaluate both joint units and researchers (*cf. infra* "Evaluation"). There are six discipline specific committees[15]. Half of SSC members are appointed by INSERM chairman, the other half are elected by INSERM staff and by people contributing to INSERM work[16].

The relationship between the Scientific Council and the SSC in terms of evaluation needs to be clarified.

The CEO makes the final decisions on creation and renewal of joint units, based on assessment by the Scientific Council. However, the joint units are also evaluated by HCERES. When HCERES and SSC provide conflicting advice, the Scientific Council has to decide. According to the President of the Scientific Council, such situations are quite rare and are solved by discussions between the Council and SSC to coordinate their decisions.

The committee considers this is a situation (different opinion in the evaluation of a research unit between SSC and HCERES) which needs to be stated clearly for the good management of INSERM.

d/ The Thematic institutes

The 9 INSERM thematic institutes are discipline-specific: Molecular and structural basis of life sciences; Cell biology, development and evolution; Genetics, genomics and bioinformatics; Neurosciences, cognitive sciences, neurology and psychiatry; Cancer; Immunology, inflammation, infectiology and microbiology; Physiopathology, metabolism, nutrition; Public health; Health technologies. To ensure a better coordination of health research, they are the same as AVIESAN's thematic institutes.

There were originally ten institutes, but they were later reduced to nine, after combining two of the institutes. They are virtual networks covering all relevant units/institutes and have proved most useful for larger disciplines scattered across multiple sites. Their role might be considered as that of a think tank. They are given relatively small amounts of funding from INSERM, which is used for coordination, organising meetings and incentivising work. They support the directors of joint units with funding renewal bids. Some have been successful at attracting

[15] SSC 1: Living Molecular and Cellular Mechanisms; SSC 2: Developmental Disorders, Hematology, and Cancer; SSC 3: Large System Physiology and Physiopathology; SSC 4: Neuroscience; SSC 5: Immunity and Infection; SSC 6: Public Health and Health Technology.
[16] Decree n°83-975 of 10 November 1983.

additional external funding to support their role. The Leads of the thematic institutes are quite enthusiastic and happy in their role and did not ask for more independence in terms of budget. They do have provided a useful single disciplinary point of contact for the ministries. The thematic institutes have successfully worked together on cross-cutting initiatives and applications.

Thematic Institutes are also major advisors of the CEO in setting the scientific strategy of INSERM and its relationships with other French research agencies through AVIESAN. Scientific partners like CNRS and INRAE state that the CEO of INSERM actively listens to problems and secures a positive and constructive collaboration.

Everyone consulted from these structures of governance agreed that the scientific strategy, flexibility and reactivity, and thereby governance of INSERM, are hampered by the lack of means allocated to the institution by the authority ministries.

In conclusion, the committee confirms that the governance of INSERM is indeed widely based on science as claimed in the 2025 strategic plan.

2 / Communication policy

Even though INSERM has been in existence for 50 years, it struggles to achieve sufficient visibility. In its SWOT analysis, INSERM identifies a "weak institutional profile among the general public"[17]. This was confirmed by the interviews carried out during the visit: the institute is placed in 4th position for spontaneous recognition and in 3rd position for brand awareness. INSERM would like to be perceived well by society and to reinforce its mission. INSERM decided to launch its new website in December 2017, to make a major public communication effort in mid-2018 and to launch a brand communication campaign (web and TV) in August 2020.

INSERM consulted widely in the design of its new strategic plan. This went well and the committee deems important that INSERM maintains this level of external engagement in the future.

INSERM recognized that during the COVID-19 crisis, improving the image of the institute was a collective challenge. The CEO regularly appears in the media (once per month).

The Department of communication offers media training to researchers. Priority is given to INSERM's scientists, but it is also open to researchers from joint units and to other academics.

INSERM recognizes that external communication targeted at companies to support valorisation can be improved. INSERM-Transfert has its own brand communication strategy.

To improve internal communication, INSERM created an intranet 3 years ago and has a corporate social network. INSERM uses this tool to showcase individual staff members via portraits and interviews. The traffic to the website is quite good, with 5000-page views per year. INSERM organises meetings of joint units directors with the CEO, meetings with the regional office directors and other events. A specific communications day is organized for newly appointed joint units directors.

The digital library is the heart of scientific and technical information and has been refreshed, with 6 000 connections.

3 / Financial affairs, human resources, real estate, and information system

a/ Financial affairs

The INSERM budget amounts to €966 million total, of which €631 million comes from the State subsidy for public service. The State subsidy mainly funds salaries (80 % of total) and costs of joint units, leaving only €6 million for strategic initiatives.

It would be more efficient if funding for some specific projects, such as public health, could go directly to INSERM from the Ministry of Health, rather than via the CHUs.

INSERM has been efficient at attracting external funding. This is very positive, but is not a reliable way to grow income because of the unpredictability of external funding streams, the restrictions associated with the way the money can be spent, and the need to cover the indirect costs of externally funded research. In comparing marginal external funding with allocated total costs, INSERM argues that 1 additional euro of external funding,

[17] SAR, p. 46.

"costs" €1.26 to the Institute. This is based on a total cost analysis, including non-direct expenses from joint units, which the Institute would incur even in the absence of external funding. External funding usually includes management overheads (from 4% to 20% depending on the funding institution).

The 2020 INSERM's budget amounts to €966 million, including 65 % of public subsidy and 35 % of external funding. The identification of streams of external funding ("*ressources propres*") has helped the overall growth of the INSERM budget over the past 10 years, in a context where its core funding (State subsidy for public service) has remained constant. Between 2016 and 2020, external funding raised by 39,4 % (€240 to €335 million)[18]. This situation illustrates the dynamism of the INSERM teams, which have been able to attract a growing amount of external funding from various sources (ANR, PIA, French regions, Europe, industrial partners and other sources). It is also characteristic of the emphasis put by the French Government on increasing the financing of research by project-based competition. As a whole, the current balance between project-based financing and core financing seems appropriate.

The primary drawback of this situation is the rigidity that it brings to the INSERM budget. While external funding is committed to specific projects, the core funding is mostly pre-allocated:

- 80% of the core funding goes to salaries, with little room for manoeuver since INSERM employees are mostly civil servants;
- €42 million go to the funding of ANRS and €26 million go to the funding of "Plan Cancer". In both cases, INSERM is acting as a funding agency and its budget is mostly a pass-through. Ultimately, the money allocated to these two activities does not necessarily go to the funding of INSERM teams;
- around €55 million are annually allocated to the basic support provided to the 261 joint units, which equates to about 200 k€ per joint unit on average. The basic support is computed taking into consideration the total scientific headcount (total researchers in the unit, regardless of employer) as well as some qualitative component based upon various criteria (such as team assessment, scientific project and international strategy). Interestingly, this basic support is allocated for 5 years, which provides great visibility to joint units, but puts some pressure on the yearly INSERM budget. Although 200 k€ is a rather limited amount, this support is attractive to joint units and INSERM faces a growing demand for the INSERM label. On the other hand, there is a tendency to decrease the total number of joint units, following a consolidation process.

As a result of these major commitments and ring fences, only €3 to €6 million remains available on a yearly basis to deploy on the CEO's scientific policy. The Technology Research Accelerators (ARTs) were created in that context, and specific equipment financing campaigns are also funded on this budget. This amount is made to work hard and is very useful. For example, it is used in the transverse programs – e.g. on ageing – and 500 k€ per year supports 15-20 groups who use it for seed funding / pump-priming projects that are then very successful at leveraging external funding. The INSERM funding is time limited and the academic community are then responsible for prioritizing research and obtaining external funding. Albeit extremely valuable, the amount available remains quite small. Lack of sufficient flexible funding was reported to have caused avoidable delays in situations needing rapid action – e.g. Ebola, Zika, COVID-19. Without flexibility in existing funds, INSERM needs to go to the Government to seek additional funds, which requires coordination between different ministries, and overall can be a slow process.

The committee recommends that INSERM identifies ways to increase the budget available for the CEO to deploy up to a €30-40 million range per year on scientific policy.

b/ Human resources

A major problem experienced by INSERM is recruitment in an international job market. The Institute offers various positions (including civil servant positions as junior scientist "*Chargé de recherche*" or ATIP Avenir contracts). However, INSERM has no flexibility in setting basic salaries. This is true for all public servants across the whole of France and is not specific to INSERM. It means that recruitment packages are not competitive in comparison to, for example, the USA employment market. However, it is also problematic within France – e.g. in areas with a high cost of living such as Paris. Researchers accept that INSERM is forced to adhere to the French system of fixed salaries but point out that some Ministries operate a bonus system for government employees. Some people told the committee that there is also an additional supplement system available to the top 20% of researchers but that it is not well advertised by INSERM and staff are not encouraged to apply for it.

Despite this, researchers recognize that there are numerous applicants for INSERM positions. INSERM provides a 30 k€ endowment for junior scientists (CRCN) in order to meet their needs in terms of lab running costs and equipment. This practice is not common in the other French Institutions and contributes significantly to the attractiveness of INSERM. In the same way, INSERM, with CNRS, launched a call for proposals (called ATIP Avenir)

[18] Source: Evolution of income since 2011 (Annex to the SAR).

to promote mobility and to attract young researchers as high-level team leaders. This measure is attractive because the Institute funds an annual grant of 60 k€ in addition to two years' salary for a postdoctoral researcher. Thus in the present context of budgetary restraint and in strong competition, INSERM has been able to implement HR measures to improve its visibility and attractiveness.

The ability to attract MDs to INSERM is crucial to the Institute's mission, yet MDs are a minor population among INSERM scientists. Young clinicians do PhDs but are not attracted to remain in research.

From discussion with MDs, the committee concluded that low salaries are a major part of the problem.

Schemes such as the "*contrats d'interface*" providing salary supplements to MDs committed to research activities were reduced because they required joint funding by INSERM and CHUs and did not contribute to the clinicians' retirement plan.

The CEO of INSERM told the committee he plans to reintroduce the "contrats d'interface" scheme and the committee fully supports his decision.

Another consideration is that MDs usually do not have as strong a research track record as basic scientists applying for INSERM positions.

The committee recommends that INSERM considers adapting his recruitment strategy to take into account the expertise of MDs in addition to their publication records.

A further barrier for clinicians is the ability to have protected time to conduct research while being clinically active. There are also regulatory constraints: if an INSERM scientist applies for a clinical project call, the PI must have an official CHU-based affiliation.

INSERM should negotiate protected time with the deans of medical faculties and provide support (salary, secretary) for directors of INSERM joint units who are clinicians.

Generous recruitment packages are an obvious way to help mitigate against low salaries. INSERM reported that it is starting to use these more. Other places give new recruits a joint unit, support staff, help with the acquisition of the special diploma and other benefits. Support packages were seen as essential to compensate for the lower salaries in France.

Recruitment of new PhD students is not a problem, because of the collaboration of INSERM units with other institutes, schools, universities and CHUs. Postdoc recruitment is not a problem either. The major issue is new team leaders: poor salary in combination with little opportunity for seed money or start-up packages and competition with other countries are the problem.

Researchers are aware of the new HR protocol signed on October 12th 2020 by the Prime minister with the trade unions and the new regulation ("*Loi de programmation pour la recherche",* called "LPR"). They expect that it will help with recruitment and increase salaries but do not feel it fully addresses the demands of researchers. They fear that it will result in more temporary, short-term posts rather than tenured posts and recurrent funding. Both scientists and support staff can only be retained for 6 years if on fixed term contracts. People have to obtain their own fellowships.

Tenured posts were seen as desirable since the security enables high risk, blue skies research that is not possible with traditional project funding. It also enables other avenues to be pursued such as commercialisation of research outputs.

The committee heard the perspective from private research institutes that French science funding is bureaucratic, although the institutes highlighted a good relationship with INSERM and the quality of INSERM scientists. Private institutes have more flexibility than INSERM. New legislation is geared towards the public sector – there is a risk that it might make French research less competitive because of the focus on tenure and long term job stability.

c/ Evaluation

Evaluation of joint units

The evaluation of joint units is first done by HCERES. The reports are provided to INSERM, but INSERM also does its own evaluation every 5 years through its SSC with a view to deciding whether to continue funding, stop funding, or change focus. During the formal review process <5 % units are closed. However, others are closed between formal reviews as a result of intermediate discussions and informal review. In the case of joint units, formal reviews are done jointly by INSERM and the funding partner(s).

Evaluation of researchers

The SSC are in charge of recruitment, promotion and evaluation for researchers (*Chargé de recherche* and *Directeur de recherche*). Individual are evaluated at the same time, as the units have their 5-yearly review as well as once mid-term review. Line managers complete a written report on individuals, which is submitted to the committee in advance of the evaluation. It is very competitive for early career researchers to get into INSERM. The competition for tenured positions is especially fierce and they are on probation for one year, so it is relatively uncommon for scientists to underperform once they have tenure. Once appointed, the INSERM system allows early career researchers to grow into independent researchers, and team leaders and researchers in tenured posts feel free to develop their own research interests; however, support for career development is perceived as lacking. The SSC reported that they do discuss training and development needs. INSERM researchers reported that whilst their evaluation by the committee is appreciated they would value their direct line managers playing a more active role in meeting with them annually to discuss performance and development.

INSERM does not have a mentoring scheme and the committee felt that adoption of local mentoring would be a positive development.

INSERM, in common with most French organisations, does not use multisource feedback / 360 degree reviews. However, in unit reviews staff are able to feedback comments without the Director being present. Evaluation of individuals considers a wide range of metrics covering traditional academic metrics plus wider outreach work, conference organisation and other activities. Individuals receive feedback if they ask but not routinely.

It would be useful to hold workshops to inform individuals and units about the criteria used in evaluation and promotion and how to present themselves better – this needs to be carried out in conjunction with other partners (e.g. HR). INSERM should automatically implement a feedback process, in particular to support researchers to overcome difficulties and improve their career path.

INSERM offers good management training that is available within the institute but not mandatory. To further increase the overall quality of management of the institute this training could be mandatory for all senior academics.

The Research Support Commission (RSC) evaluates professional support staff. It has no role in recruitment. There has been a decrease in the number of researchers who sit on the RSC (from 70 in 2014 to 17 in 2020), which was felt to reflect the lower value placed on support staff in INSERM. This is impacting on the morale of support staff and their career progression. Support staff have a unique and important skill set, usually combining PhD training with detailed understanding of administrative, regulatory and development functions, and they require better career development support.

The committee recommends that INSERM consults with other institutions (e.g. INRAE) that are perceived as doing a better job for evaluating and supporting their staff.

ITA are quite positive with the way they can develop their career within INSERM. The Institute offers interesting career development for people who are motivated to progress. However, INSERM faces a lack of applicants.

INSERM should develop specific support to attract young people (ITA) in joint units, in particular at the beginning of their careers.

This issue has been progressed via a dialogue between representatives of the community, the commission and INSERM HR. Most of the support staff are civil servants funded by public subsidy.

There is an HR representative on both the SSC and RSC committees. The SSC and the RSC work with the Department of Programme Assessment and Follow-Up. This department is responsible for individuals, joint units, teams, programmes.

The number of SSC has fallen from 9 to 6 in 2016 which accounts for the drop in overall number of members of SSC. In contrast the number of members of RSC has stayed almost the same. **INSERM should make 'collegial' work such as this part of the promotion criteria so there is an expectation that everyone takes their turn at serving their community.**

INSERM provides training on gender equality, unconscious bias and research integrity, but this is not currently mandatory. As other French Institutions, INSERM will have to adopt a national plan on gender equality before the end of 2020. If not, a legal penalty will be paid by the Institute. The gender balance programme is addressing the 'leaky pipeline' common to most academic organisations, with a majority of female academics at PhD level and a minority in senior academic roles. INSERM exceeds the French civil service target of 6 % of posts held by people with disabilities. Collecting data on ethnicity is not permitted in France.

INSERM has subscribed to DORA criteria that promote team science and quality of research rather than evaluation simply on the basis of traditional metrics such as citations. This philosophy is starting to permeate through INSERM. The SSC reported that their evaluation methods have now extended beyond the normal academic criteria/metrics to cover DORA criteria and INSERM reports a wide range of metrics. There are opportunities to take part in activities beyond traditional academic roles, such as outreach activities. Researchers are encouraged to document all their activities, including outreach, but during evaluation there is still a strong dependence on traditional metrics except for researchers in the new grade "*classe exceptionnelle*". There is more flexibility in the evaluation of medical academics because of their additional roles. Furthermore, external agencies (e.g. funders) still evaluate applicants based on traditional metrics.

d/ Information systems

Since 2019, INSERM has defined new strategic guidelines for its Information systems policy, based on the outcomes of a survey conducted in September 2018 which highlighted the need to provide more services to meet the increased requests of the joint units, while minimising costs. INSERM has the will to put IT systems at the heart of its scientific interests.

The Institute has reorganised its IT Department into 5 services, in line with the new IT strategy. With this simplification, INSERM redefined the missions of its computer engineers in regional offices, to make them more committed to added value tasks.

The Institute needs to increase the digitalization of its management processes (HR, Finances) to make its IT system more interoperable and allow easier exchange of data.

At the heart of the IT system, 4 experts are dedicated to scientific processing (big data, artificial intelligence). As other RPOs, INSERM is facing difficulties in managing vast amounts of data (access and storage). The institute is building new server infrastructures by developing new data centres at the regional level. These are monitored at the national level, in line with the policy of the Ministry of Higher Education, Research and Innovation. This is a big challenge due to the national plan for open science.

INSERM has to remain committed to further development of data scientific management (including access and storage) in order to contribute effectively to the national open data policy.

Activities of INSERM

1 / Fundamental research

INSERM reports that it is the only French research institution that "covers the entire biomedical research continuum, from the most fundamental projects on animals, cells or using computer simulations, to therapeutic trials for which it may be the promoter or long-term studies of population or patient-based cohorts" (SAR, p. 4).

INSERM funded researchers can be proud of major achievements in discovery and translational research, including advances in gene therapy and deep brain stimulation for Parkinson's. INSERM has the capacity to organise shared research infrastructures, for instance the clinical grade vaccine manufacturing centre in Lyon. INSERM was able to respond quickly to the COVID-19 pandemic. Teams turned to COVID-19 research, when prior to the pandemic few people were working on coronavirus. Core funding provided flexibility, and the government provided €50 million additional funding.

Fundamental research is clearly valued at INSERM and is considered core business. For the 2014-2015 period the HAL-Inserm repository includes 14 575 scholarly document[19]; 80% of the documents were articles or conference proceedings. 11 705 INSERM-affiliated original articles are referenced in the Web of Science database, including 176 among the top 1% most cited worldwide. 36,5% of all biology and medicine papers are affiliated with INSERM. With a 30% increase in volume during the 2012-2018 period, INSERM accounted for 14% of French scientific production in 2018. The vast majority of INSERM papers (91%) is published in the Life Sciences field; they represent nearly 30% of the national output scientific production in this field. The Cellular & Developmental Biology, Neuroscience & Neurological Disorders subfields as well as Immunity & Infection, are the core of the Institute's production: their share of INSERM output is three to four times higher than the world average.

[19] Source: Le profil scientifique et technologique de l'Inserm, rapport d'indicateurs HCERES/OST, mai 2020,

The scientific impact of INSERM[20] is 30 % higher than the world average. These impact indices are higher than the global and national average in all fields and throughout the entire period. Publications belonging to the Life Sciences fields are over-represented in the first deciles of the distribution corresponding to the most cited citations. The share of publications in the top 1% the most cited publications is 2,7 times higher than the global average. In all Life Sciences subfields, INSERM publications receive a number of citations close to the average for journals in which they are published.

One-third of all ERC winners in France in the field of life sciences are affiliated with INSERM[21].

However, the focus on fundamental research is stronger in CNRS, for example. At INSERM, applied research, translational research, clinical research involving patients and cohorts by physician-scientists are equally valued. Academics are enabled to work and move across the two organisations.

Some INSERM teams are very basic, others more translational. There are a fair amount of physician-scientists, although the number should be increased. Through the collaborations with CHUs, there is a good awareness of the relevance of patients and cohorts. CHU members always have the point of view of patients in mind, even when INSERM members are working more fundamentally. This is different from CNRS, where there is little focus on translational activity. Researchers find that the transition from fundamental to clinical research is sometimes problematic. This translational work, from basic to applied clinical, needs continued attention, even though the institute does an excellent job in placing fundamental units within CHUs.

2 / Clinical trials / Cohorts and epidemiological studies

Medical doctors employed par INSERM who carry out research are held in the same esteem as doctors who do not, and there is no pressure to commit to full time work in the clinic. In terms of the relationship of clinical researchers with non-clinical scientists, there is a need to connect different research fields. Since INSERM joint units tend to be in CHUs, they lack the campus effect so geography is an obstacle to interdisciplinary research.

INSERM should set up a portal to connect INSERM researchers in different joint units – this would help to connect basic and translational researchers.

The challenge is to find good partners to apply for interdisciplinary research calls. The INSERM selection process tends to select for homogeneous applicants and misses the opportunity to encourage diversity.

Since 2003, the "*École de l'INSERM Liliane Bettencourt*" offers a research training to students in the 2nd year of medicine, pharmacy and dentistry. Selected students graduate with a research master's degree in 3 years, and even a PhD if they choose to continue. Candidates can enter the school in first year (60 successful candidates over 160-190 applications) or in second year (20 to 29 successful candidates after a competitive exam)[22]. **The committee considers that the "*École de l'INSERM*" is too selective – instead it should welcome everyone and then narrow later on.**

INSERM contributes to the public health policy of the country at different levels. INSERM is a major player in epidemiology and public health policy. To some extent this is an indirect contribution because many INSERM teams are involved in pathophysiology. INSERM is the key to studying disease mechanisms – it would therefore be optimal if it can be embedded in the clinic but that is rare.

The clinical department of INSERM provides expert support for clinical trials, mostly in regulation and safety matters.
INSERM runs 36 Clinical Investigation Centres (CIC), which operate at individual CHU level and cover clinical studies including clinical trials of pharmaceutical agents, biotherapies, devices and technological interventions. The Clinical Investigation Network (CIN), operated by INSERM, brings together relevant Clinical Investigation Centres around individual themes. Additional funding was obtained to establish the French Clinical Research Infrastructure Network (F-CRIN), which is a clinical trial network that includes, but extends beyond, INSERM. It covers the whole of France and supports both academic and industry led trials. INSERM is a major player within F-CRIN because of its wide remit and geographical coverage. The funding for F-CRIN has been bolstered by additional funding from the Ministry of Health and INSERM. The major structural difficulty for F-CRIN is the need to interact with multiple CHUs since there is no single point of contact.

The CINs are thematic. There were initially 10 but this has since been expanded to 15. Themes include: vaccines, paediatrics, Parkinson's disease and infectious disease. The networks have a Central Coordinating Office. The

[20] Measured by the number of citations per publication, all fields combined (rapport d'indicateurs HCERES/OST).
[21] Source: Key figures 2016-2019 (Annex to the SAR).
[22] Source: INSERM website (https://www.inserm.fr/connaitre-inserm/double-cursus-medecine-science/ecole-inserm-en-bref).

role of the networks is to share ideas, prioritise projects, develop the next generation of researchers through training, improve quality control, develop business models, assist with ISO accreditation, standardise practice, and support communications. The networks have also helped to develop links between academia and industry. The existence of the networks facilitates the recruitment of CHUs and therefore participants. However, they do not participate in the actual running of trials, which is the responsibility of the trial sponsors.

The CICs and CINs have no direct input into INSERM strategy.[23]

INSERM played a pivotal role in setting up the European Clinical Research Infrastructure Network (ECRIN), a European initiative which does not set research strategy or generate ideas for new trials, but provides infrastructure and support for multinational trials initiated bottom-up. The official French partner for ECRIN is F-CRIN, rather than INSERM. However, INSERM provides the established links to CHUs and medical academics that underpin the work of ECRIN.

Whereas the Ministry of Health provides funding for clinical trials, they require that the sponsor should be the CHU, not INSERM, and the money flows to the relevant CHUs. This presents logistical problems for INSERM, which operates across multiple CHUs, and also forces CHUs to compete. COVID-19 has been the one exception, with the Ministry of Health agreeing to INSERM being the trial sponsor, which greatly simplified the process.

Clinical research is mainly led by university medical professors (PU-PH). Some members of the research teams within INSERM reported problems due to medical academics having insufficient time to devote to running their research team, causing tensions with non-medical staff who feel they are required to take on additional responsibilities.

A consistent complaint was the long delays in obtaining ethical approvals for clinical studies, including clinical trials.

INSERM supports 15 cohorts, largely funded from the Investment for the Future programme (PIA) set up in 2012, including the ELFE[24] 2011 birth cohort and the *Constances*[25] cohort of 200 000 adults. INSERM provides a support centre and has worked with partners to recruit new people into supporting roles, such as data scientists. INSERM supports PIs in obtaining the initial funding and funding renewals. Funding is usually for five years. The Public Health Thematic Institute in INSERM successfully brought together multiple cohorts to obtain additional external funding through a collaborative bid. **There is no single directory of INSERM supported cohorts and their meta-data and investigators are required to approach individual cohorts to access the data.**

3 / Expertise and contribution to public health and research policy

Public Health is one of INSERM's nine Thematic Institutes, and more than 110 INSERM teams are dedicated to public health research according to INSERM website. However, the overall scale of public health research within INSERM is smaller than its fundamental and clinical research activities.

INSERM is a founding partner of the French Institute for Public Health Research (IRESP), which acts as an interface between research organizations and decision makers in the field of public health. A new agreement has been signed in May 2020 with several stakeholders[26]. This partnership has meant in particular pooling resources and tools to launch several calls for projects in public health, leading to funding for 125 projects between 2016 and 2020 (SAR, p. 40).

INSERM supports the French Health Data Hub (HDH). This was set up in 2019 in response to the French government's strategy to promote the application of artificial intelligence to health. The initiative includes expansion of the National Health Data System that collects routine health data covering diagnostic investigations, primary care, secondary care, and deaths. The aim of the HDH is to facilitate secure access to these data by providing computational infrastructure, tools and services that support data providers and those who wish to access the data including: academics, clinicians, industry, and the public.

Many of its public health activities are initiated by the Ministry of Health. The Director General of Health has requested expert guidance from INSERM on specific topics, such as alcohol-related injuries and the impact of

[23] According to interviews.

[24] ELFE: *Étude longitudinale française depuis l'enfance*. The ELFE cohort is "led by INED and INSERM in partnership with the EFS" (source: https://www.elfe-france.fr/).

[25] The Constances cohort is "carried out thanks to the participation of CPAMs and health examination centers, and is the subject of a partnership between the University of Versailles Saint Quentin, Inserm, the CNAMTS, the CNAV and the French Ministry of Health "(source: https://www.constances.fr/cohorte/presentation-constances.php)

[26] IRESP is a scientific interest group ("groupement d'intérêt scientifique") gathering the ministries of health and research, DGRI, CNAM, CNSA, INCA, Santé Publique France, DREES, MILDECA, CNRS, and INSERM.

pesticides on health. INSERM has participated in the development and implementation of the Ministry's National Health plans including: Lyme disease; antibiotic resistance; health and environment. INSERM coordinates the French component of several projects supported by European funding such as the joint vaccination action, the joint antimicrobial resistance action, and the HBM4EU chemical hazards programme.

Then it clearly appears that the Ministry of Health has the main lead on the public health research initiatives.

Considering the relatively poor number of INSERM teams dedicated to public health in regards of teams involved in basic research, the committee proposes that INSERM should take more power in conducting public health research policy and increase its activity in this domain.

4 / Technology transfer

INSERM provides a fertile ground for technology transfer. Its scientific excellence is unanimously praised. The 261 units under INSERM co-management cover a broad array of health science and the willingness to go from science to the lab is included into the INSERM mission statement.

The OST patent database contains 623 priority applications filed by INSERM between 2007 and 2016[27]. In the 2016-2020 period, INSERM filed on average 283 invention disclosures (170 new patents each year)[28]. These priority applications have generated 5 150 extensions mainly filed with EPO, the USPTO and under the Patent Cooperation Treaty (PCT) at international phase (WIPO). Between 2008 and 2017, INSERM filed 1 379 applications with the EPO, almost 50 % of which were in the pharmaceutical Products subfields. The Biotechnology (23%) and Biological Material Analysis (14%) subfields are also responsible for a large number of patent applications to the EPO. Over the entire 2008-2017 period, co-patenting represents nearly 90% of INSERM total applications. Most co-patenting is carried out with French public institutions (85% of total applications); 13% are undertaken with companies and 10% with foreign institutions.

As a result, joint research projects with industrial companies represent circa 15% of INSERM external funding ("*ressources propres*"), which would mean around €45 million a year, out of an inventory of multi-year contracts close to €136 million, with big name companies like Dassault, AZ, MedImmune, Sanofi, BMS, Orange and Google. This result, which could of course always be improved, is quite satisfactory and demonstrates the ability of INSERM to get involved in close relationships with international partners. It also demonstrates the quality of the research conducted at INSERM. Finally, contractual relationships already established with Orange and Google demonstrate the fact that the path towards digital health, IA and health data management already exists.

The committee recommends leveraging these relationships to build broad long-term partnerships (meaning, not project based but encompassing their whole research strategy) with several flagship companies.

About 100 start-ups have been created from INSERM research since 2010. Though satisfactory, this number needs to be measured against the size of the Institute: **the creation of 100 start-ups, out of 300 joint units, equates to an average of about 1 start-up per joint unit every 30 years. Seen from this angle, there is definitely room for improvement.**

The AVIESAN Thematic Valorisation Consortium (CVT)[29] participates in the valuation of the activities of its members by offering a national vision to promote and amplify the detection and emergence of innovative research projects.

INSERM-Transfert was incorporated in 2006 as a private company, fully owned by INSERM, from the spin-off of the internal DVTT (technology transfer division). Its mission is to manage technology transfer and innovation on behalf of INSERM, under the specific framework of a public service delegation ("*délégation de service public*"). Its mission seems clearly defined, except for a potential positioning conflict with the Technology transfer accelerator offices (French SATTs[30]). The company is now down to 85 employees, from about 100 a few years ago.

Although legally independent, INSERM-Transfert is managed at arm's length by INSERM and the INSERM CEO chairs the INSERM-Transfert advisory Board. His Vice-CEO also sits on the board. Decisions are reportedly signed, and sometimes can be challenged, by INSERM executive management after having been negotiated by INSERM-Transfert. 93 % of the business of INSERM-Transfert is related to INSERM. The business model of the

[27] Le profil scientifique et technologique de l'Inserm, rapport d'indicateurs HCERES/OST, mai 2020.
[28] Key figures 2016-2020 INSERM.
[29] https://cvt.aviesan.fr/cvt-aviesan/.
[30] *Société d'accélération du transfert de technologie.*

company relies on multiple revenue streams, all of them being tightly related to INSERM, which provides a clear incentive to grow the technology transfer activity of INSERM:

- 20 % on licencing revenues;
- 10 % on R+D industrial contracts, whatever the size of such contracts;
- Collaborative projects: set up fee plus project management fee.

Structuring INSERM-Transfert as a private entity, separate from INSERM, is a sound business decision. It makes it possible to measure the efficiency of the technology transfer activity of INSERM, which is now marginally profitable (not taking into consideration the cost of the patents that are paid in full by INSERM). It is also an interesting move to level the playing field when negotiating with private companies.

INSERM-Transfert is unanimously praised for its patent expertise. The company is said to have a particularly good interaction with researchers and to be extremely professional. Nevertheless, many issues were raised by interviewees related to the way INSERM-Transfert operates.

INSERM-Transfert is said to be heavily focused on administrative and legal issues. As a result, time to negotiate a patent licence can take up to a year, which contrasts with the need of start-ups to evolve in a fast paced environment. Intellectual property valuation claims are criticized for being sometimes unreasonable and INSERM-Transfert for being too greedy in its financial claims. As a result, some industrial partners say they avoid dealing with INSERM-Transfert whenever they can (and reach out to CHUs to do business under more friendly conditions). There seems to be even a working group within France Biotech entitled "What to do with INSERM-Transfert and SATTs?" Finally, complaints have been voiced that INSERM-Transfert is not the facilitator that it should be, and should work on the fluidity of the relationship between academic and private partners and strive to simplify the life of entrepreneurs. Both industrial partners and entrepreneurs are expecting a value-added service they claim not to receive.

The apparent lack of efficiency of INSERM-Transfert needs to be qualified. There is a French tendency to consider that everything that is coming from the public sector should be available for free, and without any constraints. Other international experiences confirm that negotiations are equally difficult elsewhere, even in the US (NIH, Berkeley, Stanford). As far as valuations are concerned, investors know what to expect and are likely to renegotiate unreasonable previous deals. The committee understand that negotiation delays span currently between 3 to 6 months, and that, according to the CEO of INSERM-Transfert, there are no current reported issues. Most of the problems are claimed to date back to previous periods of time (or result from confusions with other technology transfer offices). Furthermore, negotiation terms and conditions by INSERM-Transfert are claimed to follow international standards, with the clear, and appropriate, willingness not to enter into "low cost" deals.

The newly appointed CEO of INSERM requested an independent assessment of the situation. This analysis resulted in positive feed-back, recommending some fine tuning to be done[31]. INSERM CEO stated that he felt reassured that INSERM-Transfert is a good tool that should not be changed too quickly. Most of the 32 recommendations from the independent assessment will be implemented. Some of them are already in place (including "*mandataire unique*", Board of SATT, one university President on the Board of INSERM-Transfert). The public service delegation is being rediscussed (with signature targeted for June 2021) to include some recommendations from the assessment report.

The committee recommends:

- to follow through on the implementation of the relevant recommendations from the independent assessment report on INSERM-Transfert;
- to implement measurement of operational KPIs to monitor the work done by INSERM-Transfert;
- to communicate on such KPIs.

The positioning of INSERM-Transfert (patent management, patent licencing, management of bilateral and collaborative research contracts, management of European contracts, innovation, backing of start-up creation) is a classic one. Three questions are discussed: (a) positioning related to SATTs, (b) development of entrepreneurship, (c) potential equity investment in start-up companies.

a. The positioning of INSERM-Transfert related to SATT

This positioning would benefit from some clarification, both internally and externally. External players lack understanding of the respective roles of SATTs and INSERM-Transfert. This confusion results from the ambiguity of

[31] The key recommendations of the INSERM-Transfert evaluation report (December 2019) are to secure INSERM-Transfert scope of action at least relative to the current 185 joint units: Preserve INSERM-Transfert's management role within 55 joint units for which INSERM is the single agent and of the seven teams in joint units under a tripartite agreement; consolidate the alliance with the Erganeo SATT so that INSERM-Transfert can continue to act as a co-manager in the 33 joint units within the scope the SATT's scope; formalize INSERM-Transfert's management role in at least 90 additional joint units for which INSERM must have the status of the single agent.

the respective missions of SATTs and INSERM-Transfert, as they can both claim, on certain territories, to be in charge of technology transfer on behalf of INSERM. This potential conflict calls for a segmented approach along the Technology readiness level (TRL) scale. SATTs do have financial means that INSERM-Transfert does not have (their collective endowment exceeds €900 million) to run project maturation. On the other hand, INSERM-Transfert benefits from a clear pre-existing relationship with the joint units and has the ability to back projects through its COPOC program (up until TRL 3). It would seem appropriate to define a clear hand-over of responsibilities between INSERM-Transfert and SATTs, around TRL 3, to clarify the situation.

Internal players can also be confused when dealing with SATTs. The ambiguity of the respective roles of SATTs and INSERM-Transfert is worsened by the necessity to recapitalize SATTs and the apparent need to "take money out of the pocket of INSERM" to fund SATTs, when this money is coming from the French "Invest in the Future Program" (PIA[32]) and INSERM is only a passive conduit for that financial transaction.

The committee recommends defining and putting in place a clear hand-over of responsibilities between INSERM-Transfert and SATTs, and explaining internally the role of SATTs (reason for creation, business model, and specificities), the positioning of INSERM-Transfert with regards to SATTs, and the success stories of SATTs involving projects coming from INSERM joint units.

b. The development of entrepreneurship

Technology transfer based out of a research institute depends on the willingness and ability of researchers to adopt the mindset of entrepreneurs. The committee understands that the current management of INSERM is keen to adopt a policy in favour of entrepreneurship. The cultural gap that exists in France towards entrepreneurship is a major problem, which needs to be addressed, at various levels, through a voluntary approach.

It was reported that, although the individual assessment process in place within INSERM takes into consideration some form of technology transfer (limited to patent applications), this process fails to properly capture the essence of entrepreneurship: assessments are made by people without any business culture or experience. EVA3 software[33] does not allow researchers to value issued patents in a proper way; private/public partnerships are not considered. At the end of the day, publications are considered to be better career openers than experience in technology transfer.

The "Entrepreneur Path" put in place in 2017 by INSERM-Transfer is a remarkable initiative. With the goal to transform a desire to have an impact into a business that has the potential to grow internationally, it introduces researchers to a train of thought leading to "educated entrepreneurship". 60 people have been through this process so far.

More generally, there may be a lack of opportunities for academic researchers to informally interact with industry researchers and exchange on their respective expectations.

Finally, if technology transfer is to become a major topic of interest for researchers, a specific emphasis could be placed on communicating the importance of technology transfer at INSERM level (and not only at INSERM-Transfert level). Technology transfer seems to be addressed at Board level only when dealing with the INSERM-Transfert annual report or when presenting recapitalization of SATTs. Presenting success stories illustrating technology transfer achievements would bring some value. Likewise, global INSERM communication seems to be very keen to help communicate research findings but less so in promoting successful impact.

The committee recommends defining an ambitious INSERM entrepreneurship policy. INSERM should use examples and role models, and a specific emphasis could be placed on communicating the importance of technology transfer at INSERM level, and not only at INSERM-Transfert level.

c. The potential equity investment in start-up companies

Equity investment in start-up companies is done by INSERM-Transfert, mostly via the means of transformation of upfront licence payment terms. INSERM-Transfert Initiative (ITI), the investment fund associated with INSERM, has had good success stories but does not invest anymore. This does not seem to be a specific issue for the INSERM-Transfert management. Indeed, the point can be made that many investment funds are targeting Life Science today (when only 3 of them existed in France in 2005). In this context, there is no specific need to recreate an INSERM specific vehicle. Bilateral agreements with partner venture capital firms could be enough to fund INSERM-based start-ups.

[32] *Programme d'investissements d'avenir.*

[33] EVA3 is an internal INSERM software dedicated to evaluation processes. Researchers use it to apply for calls for projects, recruitment exams, promotions, and creations of external structures. They need to fill in a single CV showing professional experiences, management, direction, valorisation, etc.

More generally, the means of action of INSERM Transfert seem to be limited by its business model and its financial capacities. INSERM-Transfert was created with an initial parent loan of €8 million, which is reimbursed up to half at that stage, through payments out of the company net results. Consequently, INSERM-Transfert is left with limited investment capacities. Current management was able to develop imaginative ways to provide leverage on the resources available, for instance having the Universities (IDEX) or the Regions contribute financially to its pre-maturation program (COPOC). In the context of pre-start-up creation, the INSERM-Transfert initiative of asking for ante-creation commitment by venture capitalist funds is extremely promising. The committee understands that the Belgian Biocube is the first venture fund to be part of this ante-creation process. Part of the money they have raised is allocated to a specific budget to fund projects prior to the creation of a start-up, in a co-construction logic. Following this example, the ability of INSERM-Transfert to invest 300 k€ to 500 k€ per project, next to venture capitalist money would have to be considered (provided there is a clear delineation between this means of action and what the SATTs are doing).

The committee understands that, following the independent assessment, the current plan is to defer the reimbursement of the loan up until INSERM-Transfert has gained financial autonomy. This money could be used to develop an entrepreneurship or a digital health policy.

The committee considers that within a context where research is expected to benefit quite significantly from unparalleled financing tools (*loi de programmation de la recherche, programme d'investissements d'avenir 4, plan de relance*), increasing the investment capacity of INSERM-Transfert would seem appropriate (to provide the support needed to match the effort put into encouraging academics to achieve impact).

5 / Biomedical research infrastructures

INSERM is involved in 38 joint service units ("*unités de services*") and more than 150 platforms open to collaborations (SAR, p. 28)[34]. In particular, INSERM participates in 14 national research infrastructures recognized as "*infrastructures de recherche*" (IR) in the French national strategy of research infrastructures[35], within the framework of the ESFRI roadmap. 3 of these research infrastructures are directly managed by INSERM: HIDDEN[36], INGESTEM[37] and F-CRIN (SAR, p. 28).

This area was not discussed in any depth during the interviews. The main aspect was the importance of ITA to enable running of most of INSERM's research infrastructures. Despite the estimated workforce balance between the numbers of ITA and researchers within INSERM, many comments from interviewees tended to emphasise the need for more staff support. However, most of the scientific partners state that INSERM is playing a key role in providing joint units and research infrastructures that no other institutes/organisations offer. There is therefore a need to review the existing staff investment in biomedical research infrastructures.

The committee considers that given the importance of these research infrastructures to all partners of INSERM as well as INSERM itself, the staff review should be done collaboratively with every partner from the joint units to ensure fair investment from all parties into critical biomedical research infrastructures.

[34] All infrastructures are listed on https://infrastructures.inserm.fr/.

[35] *Stratégie nationale des infrastructures de recherche, available on: https://www.enseignementsup-recherche.gouv.fr/cid70554/la-feuille-route-nationale-des-infrastructures-recherche.html#fr.*

[36] HIDDEN is a class 4 highly pathogenic agents research infrastructure. It is the French link in the European Erinha network, dedicated to studying emerging infectious diseases and led by INSERM.

[37] INGESTEM is the sole French partner in the international GAIT (Global Alliance for induced Pluripotent Stem Cell Therapies network).

Conclusion

1 / Strengths

- CEO and Vice-CEO's leadership, management is really progressive.
- INSERM funds excellent fundamental science and links to the clinic.
- INSERM is piloting new approaches e.g. 50:50 clinical: research positions.
- INSERM has recognised the dangers if citizens lose faith in science.
- Large patent portfolio, successful start-ups.
- Wide geographical coverage and a lot of partnerships within France and abroad that can provide a strong foundation for initiatives such as F-CRIN and ECRIN.
- Vision that INSERM can bring to science; INSERM as a badge of excellence for the majority of universities.
- High quality of INSERM research infrastructures available to joint units.
- Attractive to PhD students.
- Good working environment for unit leaders.

2 / Weaknesses

- In comparison with fundamental and clinical science where there is strength and breadth, public health is much smaller in scale and restricted to a few specific projects. This relative gap detracts from INSERM's remit to be France's national institute covering the full range of health research.
- Most of the Ministry of Health funding requires CHUs sponsors, which can provide logistical problems and is not always scientifically meaningful. Lack of attractiveness of INSERM for MDs.
- Professional support staff – do not feel valued or given access to tenure.
- Day-to-day interactions between INSERM staff and private companies could be improved – INSERM works better with SMEs than Big Pharmas.
- Unit leaders would appreciate standardization of software.
- Service-level agreements on ethics and INSERM need to ensure timely decisions with KPIs.
- Annual budget, with in-year spend, makes it hard to provide a 5 year strategy.
- Communication between SATT and INSERM-Transfert could be reinforced further.
- INSERM has multiple routes through which to engage with the Ministry of Health: representation on INSERM's Management Board, directives and meetings with the Director General of Health, and the National Plans. As yet this has not translated into a meaningful two-way dialogue with the Ministry that would help to shape INSERM's strategy and INSERM's work informing French health policy.
- Newly created Directorate of Strategy has to further increase the interactions with INSERM scientific stakeholders.
- INSERM Board is not functioning effectively – needs to consult more effectively.

3 / Recommendations

- INSERM should identify ways to increase the budget available to deploy up to a €30-40 million range per year on scientific policy.
- INSERM should increase its interdisciplinary research. This requires a stronger collaboration between INSERM and other institutions, such as CNRS, and should be facilitated at Ministry level.
- INSERM should provide greater support for research within its agency through investment in project management, including better administrative and financial support.
- Functions such as ethical approvals and IP/licensing need to adopt a more business-like model; using tools such as KPIs and audit, to ensure timely support to researchers.
- INSERM should discuss with relevant partners the possibility of setting up a one-stop shop for European collaboration infrastructure similar to the Dutch HealthRI.
- INSERM researchers should be encouraged to participate in research-led teaching.
- INSERM's governance procedures would benefit from:
    - Staggered terms of appointment for members of the Scientific Council to improve continuity and retention of business intelligence;
    - Encouragement of researchers to support collegial activities (such as SSC/RSC membership) by including them in the promotion criterion.
- Retention of new staff would benefit from:
    - The wider use of packages, commensurate with those offered by ATIP-Avenir, for new recruits to offset the problem of low, fixed salaries;
    - Adoption of new models such as the proposed 50:50 clinical: research positions.
- Existing staff would benefit from:

  - Establishment of a staff mentoring scheme for academic, technical and support staff;
  - Mandatory training in gender equality, unconscious bias and research integrity for all academic staff;
  - Management training of staff in senior positions;
  - Better career pathways and progression for technical and support staff.
- The evaluation of individuals, units and programmes would benefit from:
  - Wider recognition of impact beyond academic achievements;
  - Expansion of the evaluation of individuals to cover staff development as well as evaluation of performance;
  - Automatic feedback of evaluations to the staff members being evaluated and their line managers;
  - Workshops or other methods should be used to inform individuals/units about the criteria used for evaluation and promotions.

List of acronyms

A

ANR	*Agence nationale de la recherche* (French National Research Agency)
AP-HP	*Assistance publique - Hôpitaux de Paris* (Paris hospitals trust)
AVIESAN	*Alliance nationale pour les sciences de la vie et la santé* (French National Alliance for Life Sciences and Health)

C

CEO	Chief Executive Officer
CHU	*Centre hospitalier universitaire* (University hospital)
CIC	Clinical Investigation Centre
CIN	Clinical Investigation Network
CIRAD	*Centre de coopération internationale en recherche agronomique pour le développement* (French Agricultural Research Centre for International Development)
CNAM	*Conservatoire national des arts et métiers*
CNRS	*Centre national de la recherche scientifique* (French National Center for Scientific Research)
CNSA	*Caisse nationale de solidarité pour l'autonomie*
COPOC	Contract proof of concept
CR	*Chargé de recherche* (Junior researcher)
CRO	Clinical Research Organisation

D

DGRI	*Direction générale de la recherche et de l'innovation* (Directorate General for Research and Innovation within the French Ministry of Higher Education, Research and Innovation)
DORA	Declaration on Research Assessment
DR	*Directeur de recherche* (Senior researcher)
DREES	*Direction de la recherche, des études, de l'évaluation et des statistiques* (Direction of Research, Studies, Evaluation and Statistics)

E

ECRIN	European Clinical Research Infrastructure Network
EFS	*Etablissement français du sang* (French Blood Establishment)
ERC	European Research Council
EU	European Union

F

F-CRIN	French Clinical Research Infrastructure Network

G

GRAM	*Groupe de réflexion avec les associations de malades* (Think Tank Network with Patient Organizations)

H

HCERES	*Haut conseil de l'évaluation de la recherche et de l'enseignement supérieur* (High Council for the Evaluation of Research and Higher Education)
HDH	French Health Data Hub

I

IDEX	*Initiative d'excellence* (Excellence Initiative Label)
INCA	*Institut national du cancer* (French National Cancer Institute)
INED	*Institut national d'études démographiques* (French National Institute for Demographic Studies)
INRAE	*Institut national de recherche pour l'agriculture, l'alimentation et l'environnement* (French National Research Institute for Agriculture, Food and Environment)
INSB	*Institut des sciences biologiques du CNRS* (CNRS Institute of Biological Sciences)
INSERM	*Institut national de la santé et de la recherche médicale* (French National Research Institute for Health and Medical Research)
IRD	*Institut de recherche pour le développement* (French Research Institute for Development)
ITA	*Ingénieurs, techniciens et administratifs* (Engineers, technicians and administrative staff)
ITMO	*Institut thématique multi-organisations* (Multi-Organisation Thematic Institutes)

K

KPI	Key Performance Indicator

M

MCU-PH	*Maître de conférence des universités – Praticien hospitalier* (University lecturer – Hospital practitioner)
MD	Medical doctor
MILDECA	*Mission interministérielle de lutte contre les drogues et les conduites addictives* (French Interministerial Mission Against Drugs and Addictives Behaviors)

P

PH	*Praticien hospitalier* (Hospital practitioner)
PIA	*Programme d'investissement d'avenir* (French Investment for the Future Pogramme)
PU-PH	*Professeur des universités – Praticien hospitalier* (University professor – Hospital practitioner)

R

RSC	Research Support Commission

S

SAR	Self-assessment report
SATT	*Société d'accélération du transfert de technologie* (French Technology Transfer Accelerator Office)
SSC	Specialized Scientific Committee
SWOT	Strenghts, Weaknesses, Opportunities, Threats

T

TRL	Technology Readiness Level

U

UMR	*Unité mixte de recherche* (joint research unit)

Observations of INSERM's chairman and CEO

Inserm

La science pour la santé
From science to health

Chief Executive Officer
direction@inserm.fr

Our ref. DG-2021-048

Fiona Watt
President of the committee

Thierry Coulhon
President of The French High Council for the Evaluation of Research and Higher Education

Paris, April 16th, 2021

Objet : Observations on the evaluation report of the national institute for health and medical research

Dear Mrs Watt,

Dear M Coulhon,

As the world is facing tremendous sanitary and economic challenges, Inserm is grateful to the committee members for its work under such peculiar circumstances. We also thank all interviewees for their time. With the Covid pandemic, people have experienced what science can offer and is sometimes forgotten: understanding and hope. Building an ambitious future for French biomedical research, using this momentum and the lessons learned from the crisis is our priority. Evaluation of our past strategy and its results is key to define this future.

Inserm is among leading academic biomedical research institutions worldwide with some 12,000 publications a year and it is the leading academic patent applicant in European biomedical research (1st public-private applicant in pharmaceuticals and 2nd in the field of biotechnology). Two thirds of equity raised by biotechs in France is invested in Inserm spinoffs or start-ups and there is more to come with a promising pipeline of 70 molecules under development. It is our responsibility and challenge to keep on going for the extra mile.

As CEO of Inserm, I share most of the diagnosis and recommendations you set in the evaluation report. We will be most engaged in reinforcing Inserm scientific and innovation policies and in investing in new research technologies for our labs. We have all seen with the Covid crisis the power of working together on a specific problem and the importance of breakthrough medicines and technologies. Let this inspire us.

République Française

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Inserm

Inserm is by nature a partnership driven organization. We will cultivate our collaborations with other research institutions throughout the world and especially with our French partners in order to always increase interdisciplinary research and give best support to research teams as you suggested.
The committee also set very interesting guidance in terms of human resources. Indeed, Inserm has all it takes to be attractive and new tools set by the law on research programming bring new opportunities.
At last, Inserm is committed to act for society and with society. Expectations concerning health research, public health expertise, ethics and transparency in research, are increasingly demanding. Inserm is ready to be a trustworthy resource for decision makers as well as for everyday people. May this evaluation report illustrate to the public, the dedication and high standards of French public biomedical research.

Respectfully yours,

Gilles Bloch
CEO

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Evaluation committee

The evaluation committee was chaired by:

Fiona Watt, Professor at King's College London (KCL), Executive Chair of the Medical Research Council (MRC), and Director of the Centre for Stem Cells & Regenerative Medicine at KCL. Fiona Watt obtained her DPhil from the University of Oxford, and carried out postdoctoral research at MIT, Cambridge, USA. She established her first lab at the Kennedy Institute of Rheumatology in London, and then moved to the Cancer Research UK London Research Institute. From 2006 to 2012 she was Deputy Director of the Cancer Research UK Cambridge Research Institute and Deputy Director of the Wellcome Trust Centre for Stem Cell Research, University of Cambridge. Internationally recognised in her field, she has expertise in the stem cells of healthy and diseased skin. She is a Member of the European Molecular Biology Organization (1999), Fellow of the Academy of Medical Sciences (2000), a Fellow of the Royal Society (2003), an Honorary Foreign Member of the American Academy of Arts and Sciences (2008) and an International Member of the National Academy of Sciences, 2019.

The president of the committee was assisted by a vice-president:

Jacques Samarut, Honorary Professor at the *Université de Lyon* and hospital practitioner at *Hospices Civils de Lyon*. Jacques Samarut got his PhD at the *Université de Lyon* in 1982. He was then appointed as Associate Professor at the Rockefeller University of New York and then as Invited Professor at the Institute of Medical Science, University of Tokyo. He started his career at the Laboratory of molecular biology of cells at the *Ecole Normale Supérieure de Lyon* (ENS Lyon) and was then appointed Director of the CNRS Life Sciences Department (1997-1999). In the following years, he founded and directed two structures: the *Rhône-Alpes Génopôle* (2000-2005) and the Institute of Functional Genomics of Lyon (2007-2009). He was a member of the CNRS national committee for four years, and chaired the Scientific council of INRA from 2003 to 2010. He finally served as the President of ENS Lyon from 2008 to 2014. He received several awards including the Savoie award of the French League against Cancer (1987) and the Rosen Award of Foundation for Medical Research (1990), and the silver medal of the CNRS (1997) for his work on the role of oncogenes and nuclear receptors in oncogenic transformation. He is member of European Molecular Biology Organization (1996). He published more than 180 original articles in international peer-review journals and contributed to the creation of two biotech companies.

The following experts took part in the evaluation:

Vanessa Dumétier, Human Resources Director of INRIA. After completing a postgraduate diploma in "Public Enterprises and Services" in 2001, Vanessa Dumétier started her career at the *Caisse des Dépôts et Consignations* as an in-house legal adviser specialised in public law. In January 2003, she joined the Human Resources Department of INRA, a department she then took over herself in October 2005. In 2014 she moved to the Ministry for Education, Higher Education and Research, as "HR Strategy Officer". Among other things, she was in charge of the certification of French higher education and research institutions as part of the European Human Resources Strategy for Researchers (HRS4R). In 2016, she joined IRSTEA as Director of Human Resources and Social Relations, where she was closely involved in the merger between the IRSTEA and INRA institutes to become INRAE on 1st January 2020. She took up her current position as INRIA Human Resources Director once the merger was successfully completed.

Jeroen Geurts, Professor at the Amsterdam University Medical Centers, location VUmc, and President of the Netherlands Institute for Health Research and Development (ZonMw). Jeroen Geurts studied medical biology at the University of Amsterdam and was awarded his PhD by the Vrije University in the same city. As a VUmc researcher, he was later appointed Professor of Translational Neuroscience and head of the Department of Anatomy and Neurosciences. He is also an adjunct professor in Calgary (Canada). For two years, Geurts served as chairman of the Young Academy of the Royal Academy of the Arts and Sciences. He sat on various committees within the framework of the Dutch National Research Agenda. He is the founder of *Brein in Beeld*, an organization for the public understanding of science. In addition to his research, Jeroen Geurts serves as member of the Executive Board of the Dutch Organisation for Scientific Research (NWO).

Jean-Luc Moullet, Chief Innovation Officer of CNRS. A *Corps des Mines* state engineer and an alumnus of the *École Polytechnique* and *Mines ParisTech*, Jean-Luc Moullet started his career in 1994 at the Regional Directorate for Industry, Research and the Environment (DRIRE) of the Centre region of France, and later at the Treasury Department within the Ministry of Economy. Between 1999 and 2009, he held various positions within the Thomson-Technicolor group. He was first posted to in San Francisco (USA), where he developed industrial and strategic relations between Thomson and Silicon Valley startups. Starting in 2001 he worked for Technicolor in Los Angeles (USA), developing a set of new digital services for film studios and the post-production industry. In 2004 he founded and then headed a business unit that became the world leader in digital content traceability solutions for the media industry. In 2009 he was appointed CEO of Sephira, a family-owned SME specialising in

healthcare IT. He became advisor on industrial affairs to the French Minister of Defence in 2010. In 2012 he joined the French Prime Minister's office as Director of industrial investments for the Investments for the Future Programme (PIA). Jean-Luc Moullet took up his current position as CNRS Chief Innovation Officer in March 2019.

Sébastien Ourselin, Professor at King's College London (KCL) and Head of the School of Biomedical Engineering & Imaging Sciences at KCL. In collaboration with Guy's & St Thomas' NHS Foundation Trust (GSTT), he is leading the establishment of the MedTech Hub, located at St Thomas' campus. The vision of the MedTech Hub is to create a unique infrastructure that will develop health technologies including AI, medical devices, workforce and operational improvements that will be of global significance. Previously, he was based at University College London where he formed and led numerous activities including the UCL Institute of Healthcare Engineering, the EPSRC Centre for Doctoral Training in Medical Imaging, and the Wellcome/EPSRC Centre for Surgical and Interventional Sciences. He is co-founder of Brainminer, an academic spin-out commercialising machine learning algorithms for brain image analysis. Their clinical decision support system for dementia diagnosis, DIADEM, obtained CE marking. Over the last 15 years, he has raised over £60M as Principal Investigator and has published over 480 articles (over 26,000 citations, h-index 82). He is/was an associate editor for IEEE Transactions on Medical Imaging, Journal of Medical Imaging, Nature Scientific Reports, and Medical Image Analysis. He has been active in conference organisation (12 international conferences as General or Program Chair) and professional societies (APRS, MICCAI). He was elected Fellow of the MICCAI Society in 2016.

Jill Pell, Henry Mechan Professor of Public Health and Director of the Institute of Health and Wellbeing, at the University of Glasgow. Jill Pell is a Fellow of the Royal Society of Edinburgh and a Fellow of the Academy of Medical Sciences. She is a member of the Medical Research Council and a non-Executive Director of the British Heart Foundation's Board of Trustees. Her research covers epidemiology, health services research and natural experiments; often using routine health and administrative data and record linkage. She was Deputy Director, then Director, of Farr Scotland and is Associate Director of HDR UK in Scotland. She has published more than 300 articles and one of her manuscripts published in the New England Journal of Medicine was voted, by the American Heart Association and American Stroke Association, to be the most important research advance of the year.

The CVs of experts can be found at the HCERES website: https://www.hceres.fr/fr/liste-des-experts-ayant-participe-une-evaluation

Organisation of the evaluation

The evaluation of INSERM has been organised between March 2019 and October 2020 thanks to several meetings between INSERM and HCERES. In particular, the CEO of INSERM has expressed his expectations for the evaluation during a meeting set up on 2 June 2020 with the president of the committee.

The committee attended two plenary assemblies to prepare the evaluation and the visit:
- Preparation meeting n°1: 9 June 2020
- Preparation meeting n°2: 7 September 2020

The visit took place on 14, 15 and 16 October 2020. Due to the pandemic of Covid-19, five experts attended the visit remotely and two others participated physically at INSERM headquarters in Paris.

During these 3 days, the committee carried out 39 interviews, including a first one with INSERM CEO and his close team, and a last one with INSERM CEO alone.

The French State was interviewed through the Ministry of Higher Education, Research and Innovation.

The following partners of INSERM have been interviewed:
- CHUs
- Clinical investigation centres
- Association of patients
- Academic partners, both public and private
- Industrial partners
- Innovation partners
- Start-ups created by INSERM

In addition, the committee carried out around thirty other interviews to hear the staff of INSERM and its governing bodies (Management Board, Scientific Council, Specialized Scientific Committees, Research Support Committee, Ethics Committee and Ethics Evaluation Committee).

Following the visit, the committee have written a draft of the evaluation report which was examined by an HCERES review panel on December, 10, 2020 and January, 14, 2021. The committee gathered one last time on 5 January 2021 to finalise the evaluation report.

Jean-Luc Clément, scientific advisor, and Amaury Barthet, project officer, represented the HCERES throughout the evaluation process.

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