

HEALTHCARE **MADE IN FRANCE**

EXCELLENCE IN PATIENT CARE



UNDER THE UMBRELLA OF
**THE FRENCH HEALTHCARE
INDUSTRIES AND TECHNOLOGIES
STRATEGIC COMMITTEE**

 **French**
Healthcare



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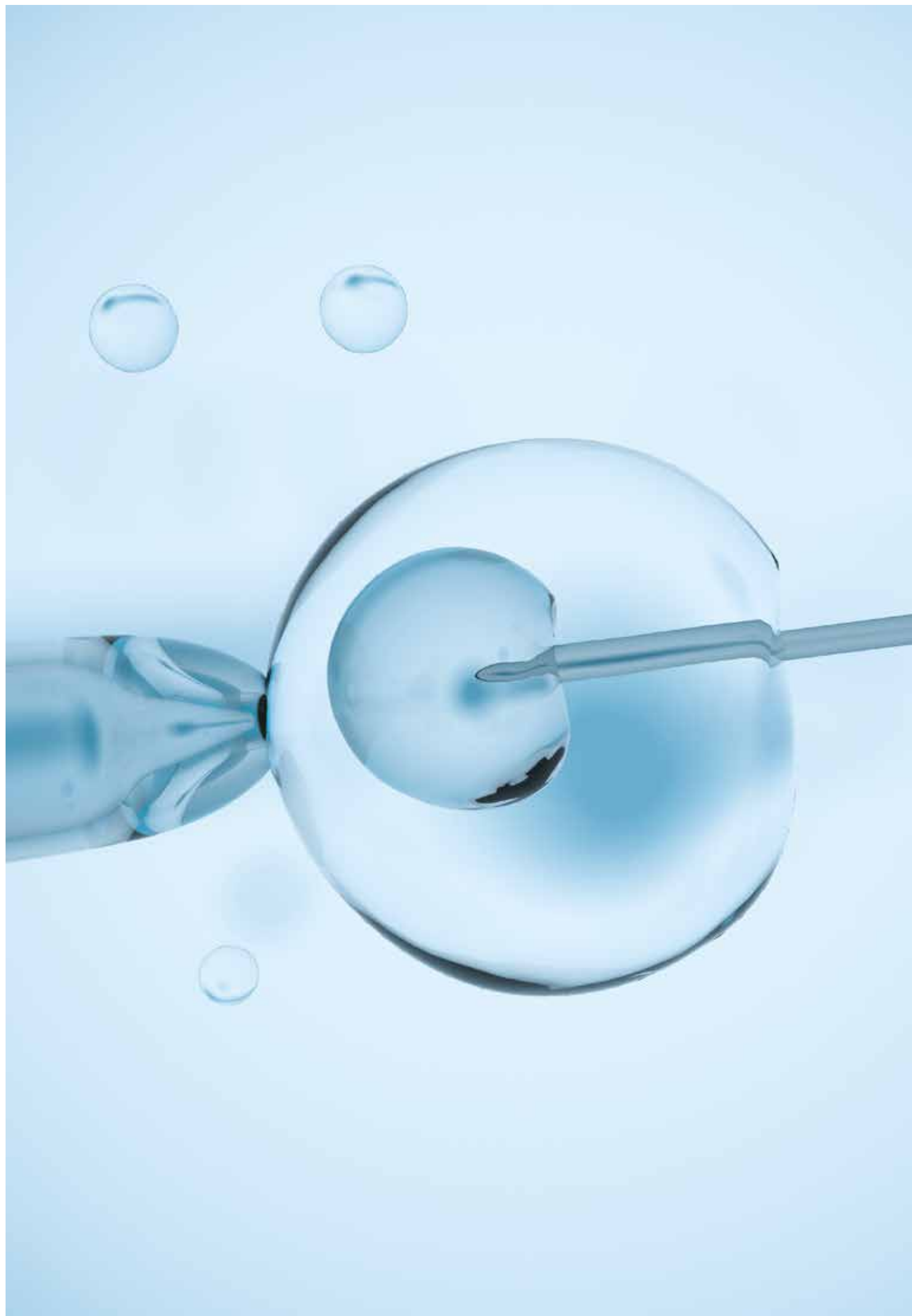
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EDITORIAL



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Advances in healthcare are driven by original, innovative, high-quality biomedical research and its rapid application to diagnostics, treatment, healthcare and public health. France is a leader in the field.

Its research teams, in which researchers and physicians work side by side, have brought it to the forefront of basic biomedical research. INSERM, the country's national institute of health and medical research and Europe's leading biomedical research organisation, comprises many teams, working in both basic research and the human and social sciences applied to medicine. INSERM is a major centre of expertise and know-how, which attracts the participation of other institutes on the leading edge of research. A leading example is the Pasteur Institute whose development of new screening tests and vaccines continues to put French scientists at the cutting edge of scientific discovery across the globe. France's reaction and rapid response to the Ebola crisis through INSERM and the Pasteur Institute demonstrate the crucial importance of the discoveries and inventiveness of French researchers on the international stage. Other key institutes engaged in basic research in the life sciences sector include the French Scientific Research Centre (CNRS) and the French Alternative Energies and Atomic Energy Commission (CEA).

Another strong point in France's favour is the development of structures to evaluate the outcomes of basic research using scientifically rigorous methods under the best possible regulatory and safety conditions imposed by the health authorities, such as early therapeutic drug trials, cell and gene therapies and medical devices. This so-called translational research benefits from dedicated facilities in the form of clinical research centres, in which France is a precursor among the European countries. Epidemiological and public health research in chronic diseases is one of its priorities, so that patients can benefit from diagnostic, therapeutic and healthcare advances, with the accent on prevention wherever possible. Healthcare systems are evolving rapidly and making increasing use of outpatient medicine, connected objects and eHealth.

France's contribution to gene therapy is an excellent illustration of the country's performance in innovative therapies and their applications. Gene therapy, launched at the Necker Children's Hospital to treat young patients with severe immune deficiencies, has produced results that are attracting the attention of medical teams worldwide and are encouraging the entire scientific and medical community to pursue pioneering research into other diseases. Like other major countries, biomedical research in France receives backing from a

number of associations that are giving new impetus to the funding of French research, in both rare and common diseases. The clinical and genetic diagnosis of the 7000 rare diseases that affect over two million people in France, is aided by rare disease reference centres set up in various hospitals. An ambitious plan in the field of genomic medicine, called *France Médecine Génomique 2025*, whose aim is to provide access to genetic diagnostics throughout the country, has just been launched by the Prime Minister in support of academic, hospital and industrial research in the field of precision medicine, one of the major challenges in medicine today.

France can be proud of the know-how it has acquired and continues to share. It can be proud, too, of the many economic and organisational solutions it has developed, proud of how it has efficiently organised access to healthcare and medicines, and proud of the generosity of its healthcare system in covering their costs. The life expectancy and quality of life of its citizens are ample proof that France today can propose comprehensive solutions to improve healthcare and treatment throughout the world that can be adapted to each healthcare system in accordance with societal choices.

FRANCE, HEALTHCARE EXCELLENCE

HEALTHCARE IS A KEY SECTOR IN FRANCE WITH ITS INDUSTRIES REPRESENTING*:

The French Federation of Healthcare Industries (FEFIS): 11 professional organisations that design, manufacture or distribute healthcare products.

- **€ 90** billion turnover
- **3rd** largest export sector, with exports worth **€ 34** billion for the entire sector, i.e. **10%** of France's industrial exports (excluding energy and aeronautics)
- **€ 6.7** billion annual investment in R&D, i.e. approximately **20%** of total French R&D spending across all sectors, not just healthcare
- **1st** sector filing patents in Europe
- **2,700** Marketing Authorisations in the field of veterinary health
- **455,000** direct jobs (and related) across the entire sector, including **5%** of direct jobs in the new digital healthcare economy
- **30,000** people dedicated to research, i.e. **15%** of R&D personnel across all sectors, not just healthcare
- **6%** of French industrial employment
- A network of enterprises across the country, comprising multinationals, VSEs, SMEs and start-ups. **90%** of medical devices and diagnostics companies are SMEs



* Rapport du CSIS 2014, et enquête interne à la FEFIS février 2017

HUMAN AND VETERINARY MEDICINES, MEDICAL DEVICES, DIAGNOSTICS, MEDICAL TECHNOLOGIES AND BIOTECHNOLOGIES

- **1,400** companies which design, create, manufacture or distribute healthcare products for a wide variety of human and animal health applications; some **60** new biotechs are created each year.
- **French biotech:**
104 products currently in the clinical phases from a pipeline of **348** products ranging from proof-of-concept to marketing

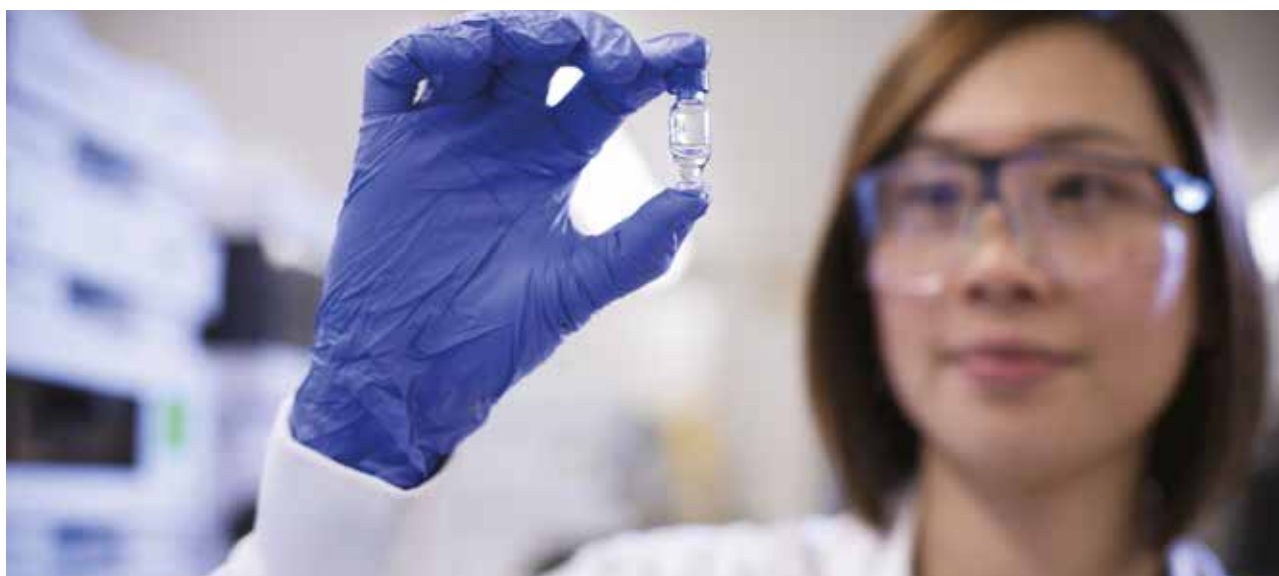
HEALTHCARE ESTABLISHMENTS IN FRANCE*

- **2,694** healthcare establishments, including **35%** public, **39%** private and **26%** private non-profit (e.g. the Comprehensive Cancer Centres)
- **655** hospital facilities for emergency treatment, **494** of which are public
- **102** emergency medical care coordination services (SAMUs) and **428** mobile emergency and resuscitation services (SMURs)
- **1,031** public establishments for people with disabilities
- **1,750** health centres** and **600** cross-disciplinary medical health centres (MSPs)***
- **331** telemedicine projects (renal or heart failure, chronic wounds, diabetes, etc.)

* Source: French Directorate General for Health Services (DGOS), 2015 edition. / ** Local practices staffed by various types of medical professionals and social workers, which support equal access to quality medical care. / *** Local practices, especially in areas of poor medical coverage, in which medical and paramedical professionals participate in social, health education and prevention actions and can share resources and split running costs.

FRANCE, A LEADER IN THE LIFE SCIENCES

France has won recognition in publication excellence in the life and health sciences across the globe. Several French public research institutions are among Thomson Reuters 2016 Top Ten Global Innovators and the leading European health and biotechnology patent owners. The key to their success is bench-to-bedside research combined with top level hospital and university involvement.



A POLICY OF EXCELLENCE TO SERVE HEALTH INNOVATION

Innovation also comes from close partnership between academic and industrial research. French research combines academic prowess, major industrial stakeholders and SMEs specialised in emerging products and services. This is the French formula for attracting talent, sustaining high quality projects and changing the dynamics of innovative, personalised medicine.

Safe, effective, useful and efficient healthcare innovations for users in France and beyond

Innovation in healthcare goes far beyond innovation in medicine, mainly because the fields concerned

which include medicines, medical technologies, in vitro diagnostics, eHealth and hospital organisation, are becoming increasingly numerous, diversified and interdependent, while the boundaries between them are becoming increasingly blurred.

France has already taken measures to promote rapid access to certain innovations, which is typical of the country's capacity to speed up access to innovative health products.

Healthcare innovation is a key public health issue. To add to the impetus of innovation in the field, the French government has appointed a **Ministerial Delegate for Healthcare Innovation** to coordinate the different sectors involved so that public health will improve day on day.

Aviesan, the French National Alliance for Life Sciences and Health, brings together France's main public and academic life and health science stakeholders in order to define strategies for its main concerns. Innovation is at the centre of each initiative supported by AVIESAN, with examples including the Cancer Plan, the Neurodegenerative Diseases Plan, the 2025 France Genomic Medicine Plan and the French National Healthcare Data System (SNDS) which is part of the Big Data revolution.



Opération chirurgicale à l'aide d'un robot



GLOBALLY RECOGNISED RESEARCH INSTITUTIONS

Four of the world's 25 most innovative public research institutions are French. This is according to the 2016 Reuters ranking, in which 1st place went to the French Alternative Energies and Atomic Energy Commission (CEA), 5th place to the National Centre for Scientific Research (CNRS), 10th place to the National Institute of Health and Medical Research (Inserm) and 17th place to the Pasteur Institute. This exceptional performance places France in pole position for biomedical research worldwide and highlights the power, progress and innovations that it consistently generates. Its leading position also reflects the organisational structure of French research which it perfectly adapted to meeting new challenges.

Within the past five years, six University Hospital Institutes (IHUs), which are the cornerstones of scientific cooperation, have become global benchmarks. These institutes, established in French university

hospitals with the help of INSERM and the CNRS, have been exceptionally dynamic in forming unprecedented research partnerships in the life sciences thus becoming a model in translational research.

This unique continuum from the patient's bedside to the industrial optimisation of outcomes, benefits research at every step along the way.

This specifically French approach in which everything starts with the patient and comes back to the patient results in undeniable progress in healthcare. Based on essential interaction between physicians and researchers, the organisational structure of French research makes it easier to shed light on the most fundamental of questions, translating them into progress that will improve the treatment of patients.

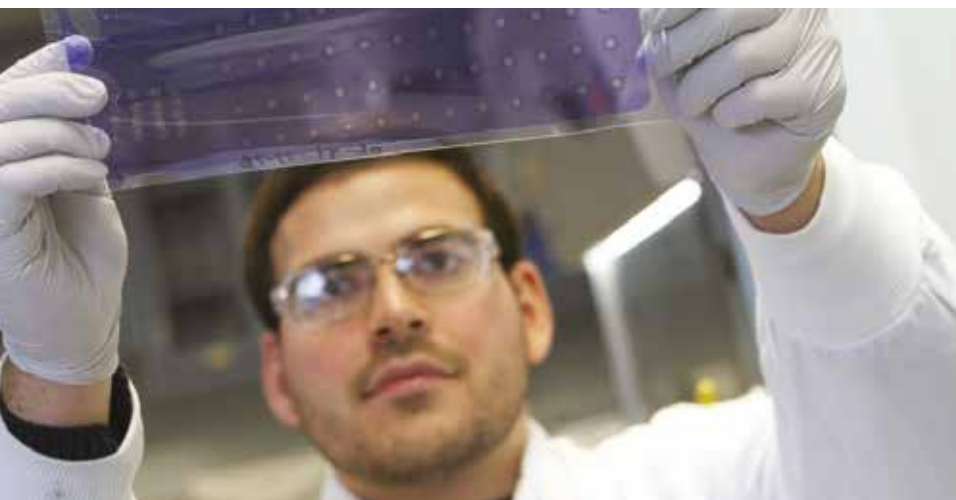
The proximity of clinical investigation centres, laboratories and enterprise forges links between their respective teams, leading to the emergence of start-ups which in turn accelerate medical innovation, the results of which are turned into treatment.

RECOGNISED EXPERTISE

4 French public research institutions among the world's 25 most innovative

6 world-renowned IHUs showcasing the effectiveness of the French model:

- **Paris: ICAN** for cardiometabolism and nutrition disorders, **Imagine** for genetic diseases and **Brain and Spine Institute** which brings together France's best teams in the neurosciences
- **Marseille: Méditerranée Infection** which responds to health crises
- **Strasbourg: IHU Mix-Surg** which is developing new generations of surgical instruments thanks to medical imaging that supports minimally-invasive procedures with considerably less risk of infection
- **Bordeaux: Liryc** paves the way for new forms of assistance to tackle cardiac electrical disorders



NEW MOMENTUM FROM PUBLIC-PRIVATE PARTNERSHIPS

The number of published research papers reflects the scientific excellence of French universities and research organisations, regularly recognised by international rankings.

« **AMONG THE LEADERS,
PARTICULARLY IN THE LIFE
SCIENCES, FRANCE IS ALSO DYNAMIC
AT INDUSTRY LEVEL.**

The incorporation of digital technologies and the use of simulation and modelling accelerate this research, which is increasingly well-coordinated between the public and private spheres.

In addition, the French Alliance for Research and Innovation in Health Industries (ARIIS) promotes closer ties within the private healthcare industries, which evaluate new therapeutic solutions and work on cross-cutting initiatives. In this way, the sectors of medicines and medical devices work together to propose turnkey solutions and simple and effective treatments especially in personalised medicine, where France is at the cutting edge.

The health industries in France are joining forces to propose solutions to stakeholders worldwide. Their association with the academic world provides a springboard for dynamic development of the life sciences in France.

The French Alliance for Research and Innovation in Health Industries (ARIIS), which federates the healthcare industries, has made it much easier to form public-private partnerships. These partnerships have multiplied in recent years because international teams interested in joint projects are now able to find their French counterparts more quickly.



INTERNATIONAL PARTNERSHIPS BENEFIT QUALITY TEACHING

International partnerships between French medical faculties and universities in North America,

China, and North Africa are a long-standing tradition. Paris Descartes University has just signed an agreement to commence a new exchange programme with the Abulcasis International University of Health Sciences in Rabat in Morocco. Students from Rabat will do internships in Paris and in return teaching staff from Paris Descartes will give classes in Rabat. These agreements, which are not only academic but also logistic and financial, showcase French know-how in the teaching of medicine. French universities and their prestigious educational teams are now also looking towards the Gulf countries and Iran. Such high-quality exchanges can be developed with many countries who are aware of the quality of the French medical teaching model. The French teams offer many classes in English, even if the ability to speak French is sometimes used as a qualitative filter to select students for training in France. The country's Master programmes are greatly valued in China, and entire education programmes based on the French or Anglo-Saxon model are offered there.

« **THE SINGULARITY OF FRENCH
MEDICAL EDUCATION LIES
IN THE ALLIANCE OF UNIVERSITY
TEACHING, HIGH-QUALITY
RESEARCH AND MENTORED CLINICAL
TRAINING.**

These synergies are fuelled by the dual nature of the country's regional university hospitals (CHUs). Clinical training given by teacher-practitioners is the predominant feature of the second three-year cycle of medical studies in France because students must complete 36 months of internship, as opposed to 25 in Germany and 12 in Italy.



Competitiveness Clusters dedicated to healthcare in France

COMPETITIVENESS CLUSTERS ARE THE ANSWER TO FUTURE HEALTHCARE

In 2004, within an increasingly competitive global economy, France introduced a new industrial policy to mobilise the key factors of competitiveness, with innovation capacity at the top of the list. The various regional Competitiveness Clusters established for this purpose are a combination of companies, research centres and training organisations. Based on a partnership approach, the purpose of these clusters is to generate synergies around joint innovative projects targeting one or more specific markets. The aim is to use these synergies and innovative collaborative projects to propel the companies to the forefront of their fields, both in France and abroad.

France has seven Competitiveness Clusters dedicated to the life sciences which offer a consolidated response to the challenges of tomorrow's

personalised and precision medicine: biotechnologies, medical technologies and digital technologies.

Within their respective territories, **Atlante Biotherapies, Alsace BioValley, Cancer Bio-Santé, Eurobiomed, LyonBiopôle, Medicen Paris Region and NHL (Nutrition, Health, Longevity)** mobilise all those concerned by innovation (SMEs, clinicians, academics and major companies) around a common ambition: innovation in the life sciences.

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IN FOCUS MEDICEN PARIS REGION

Medicen Paris Region, the Ile-de-France healthcare cluster, is located on particularly fertile ground in a region that contains over half of the country's life science innovation stakeholders. With over 250 members, Medicen has supported and accredited numerous collaborative innovation projects, including 270 funded by the State (Single Interministerial Fund, Bpifrance/Industrial Strategic Innovation, French National Research Agency, European Regional Development Fund, Invest for the Future Programme) and/or by local and regional authorities with a total investment of € 1.05 billion (including € 471 million in public aid) and has helped bring 49 new products to market in the fields of imaging, medical devices and biological solutions.



THE FRENCH PHARMACEUTICAL INDUSTRY IN FIGURES

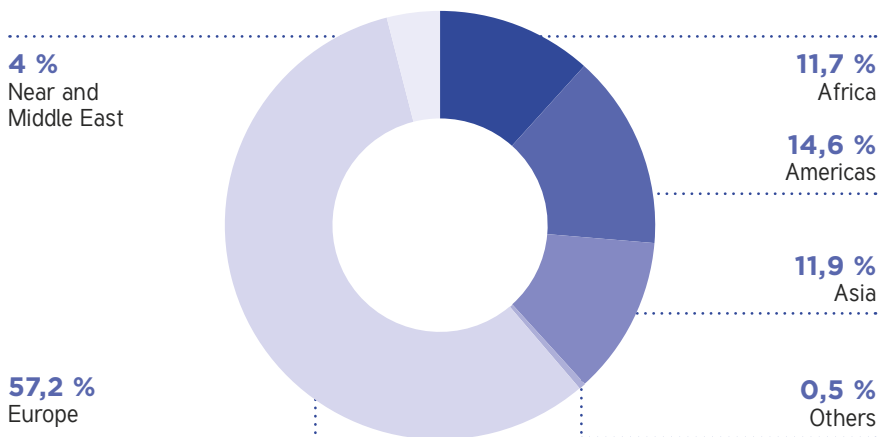
224 production sites

98,690 direct jobs

€ 4,565 million
total enterprise investment
in R&D

More than **20,000** people
in R&D

Over **€ 25.8** billion in exports,
generating a trade surplus of
€7.6 billion



French medicines exports by geographical zone in 2015

(Source: customs statistics)

FRENCH PHARMACEUTICALS: A HIGH PERFORMER AND MAJOR EXPORTER

The French pharmaceutical industry is evolving within an extremely competitive international environment and a strongly innovative and dynamic context.

The quality of its research, its highly-qualified staff, its renowned industrial know-how and ability to adapt to changing market needs have all made France the key player in global pharmaceutical production that it is today.

Governed by stringent rules and procedures at each stage of the production, distribution and export processes, and requiring highly-qualified personnel, French medicines meet the quality, efficacy and safety criteria required by the most exacting international standards.

Turnover in 2016: € 54.5 billion.

Internationally-recognised pharmaceutical and life sciences companies

G5 Health is a forum for the principal French companies in the fields of health and life sciences. These companies have generated international

development of their activities using France as a platform.

In an industry recognised by the French government as strategic, the G5 Health*companies are a major asset when it comes to healthcare innovation and showcasing French



scientific and medical expertise abroad. They have made healthcare research their priority and are the driving force behind quality

public-private partnerships which combine dynamic research companies and strong academic research (Joint Research Units with French state-owned organisations such as the Alternative Energies and Atomic Energy Commission, the National Institute of Health and Medical Research and the major university hospitals, strong member-company involvement in the Competitiveness Clusters and Technological Research Institutes, etc.). This alliance between academic research and healthcare enterprise creates the ideal ecosystem for turning concepts into concrete solutions for patients.

* BioMérieux, Guerbet, Ipsen, LFB, Pierre Fabre, Sanofi, Servier and Théa



At their 33 R&D sites and 56 production sites in France, the G5 Health companies discover, develop and produce healthcare solutions for the global market.

Their fields of activity cover all stages of patient management (prevention, diagnosis and treatment) and a vast spectrum of innovative technologies (chemistry, molecular biology, biotherapies, vaccines, imaging, in vitro diagnosis and medical devices). They focus on many major pathologies (cardiovascular and metabolic diseases, cancers, infectious diseases, brain ageing, neurologic diseases, autoimmune diseases, acquired and congenital haematological deficiencies) as well as rare diseases.

The G5 Health companies, in addition to their 56 production sites in France, have 116 production sites worldwide. Each site, which is always designed in respect of local quality standards and requirements (especially regulatory and environmental), applies G5 Health's renowned expertise and know-how in the production of quality medicines, vaccines, diagnostic systems and healthcare solutions.

With their many and varied fields of activity, their capacity for innovation and their longstanding international experience, the **G5 Health companies** are active exporters of healthcare solutions for the populations concerned and, in many cases, world leaders.

G5 HEALTH A HEAVYWEIGHT GLOBAL PLAYER

€ 42.3 billion worldwide sales

€ 6.5 billion R&D expenditure i.e. 15.5% of worldwide sales

150,000 direct jobs worldwide

116 production sites outside France

53 R&D sites outside France



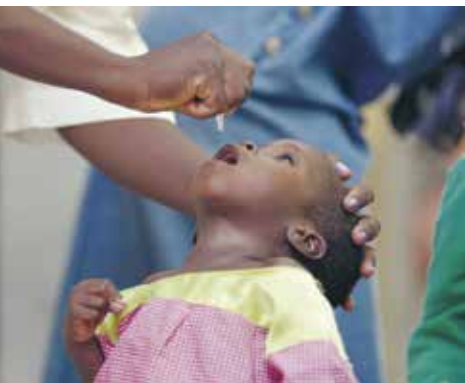
A professional organisation representing the industry: Leem

The French

pharmaceutical companies' association (Leem) is the umbrella organisation for 270 pharmaceutical companies, which account for 94% of the industry's turnover in France. Many of these companies operate abroad from a platform in France. Leem is the industry's voice in dealings with public authorities, health authorities, healthcare professionals and patient associations. Its role also involves developing and enforcing professional ethical standards thanks to its Ethics Committee. On the international level, the LEEM encourages dialogue with the health authorities of the various countries in order to move forward in areas such as regulatory harmonisation, access to quality medicines and the fight against counterfeit medicines and illegal trafficking. Leem also promotes exchanges between French and foreign pharmaceutical companies in order to facilitate commercial, industrial and technological partnerships in France and many other countries.



Louis Pasteur (1822 – 1895). French biologist and chemist, particularly known for his work on the rabies vaccine



Vaccination reduces child mortality, particularly in the developing countries.

According to the WHO, vaccinating 90% of children against 14 diseases (diphtheria, whooping cough, tetanus, measles, polio, tuberculosis, hepatitis B, Hib infection, rubella, meningococcal and pneumococcal diseases, rotavirus and, in endemic areas, Japanese encephalitis and yellow fever) could save the lives of two million children under the age of five each year.

France at the global forefront of the vaccines industry

Vaccines have contributed to France's reputation in the developing regions and countries for many decades. The spread of vaccination was fostered by the discoveries of Louis Pasteur, with the international network of Pasteur Institutes playing a frontline role in distributing western vaccines and building public health systems at local level. Nowadays, vaccination is a strategic field of activity in which France holds the leading position worldwide in terms of both R&D and production.

The two world leaders in human vaccines produce and invest massively in their French production facilities, which have a production capacity of 1.3 billion doses and provide more than 5,500 industrial jobs in the field of vaccines.

At its domestic production sites, the French leader in the field has the world's largest production capacity for the inactivated polio vaccine (IPV) and the world's leading production centre in the fight against seasonal and pandemic influenza with 140 million doses produced each year for both hemispheres (thus meeting the needs of the entire world). It also manufactures the first dengue fever vaccine, which has already been registered in a number of endemic zones, notably Mexico, Philippines and Brazil.

An export-oriented vaccines industry

At present, France exports 85% of its vaccines production. France and Europe hold a prominent place in the export of vaccines abroad, the marketplace for most of the doses they produce. In 2013, the production

sites of the European pharmaceutical companies produced 80% of the vaccines used in the world and exported 84% of their production, i.e. 3.5 billion doses per year.

In 2015, the export of vaccines contributed € 1.2 billion to the French health products trade balance.

French excellence in vaccines research

France has an extensive scientific infrastructure in terms of vaccinology and Lyonbiopôle is the first worldwide research ecosystem for infectious diseases and human and animal vaccines.

Lyon is a unique ecosystem, combining public research, world champions in vaccination and diagnostics, start-ups and small and medium biotechs innovating in the field of infectious diseases. The Gerland Biodistrict offers an exceptional concentration of players, representing 5,000 private jobs in health and biotechnologies, 2,750 researchers and the world's first private vaccines research cluster: Lyonbiopôle.

During the *Decade of Vaccines* (2011 and 2020) endorsed by the WHO, vaccination against six diseases (pneumococcal disease, Hib infection, rotavirus diarrhoea, whooping cough, measles and malaria), could save 6.4 million lives, avoid 426 million cases of disease, save \$ 6.2 billion in treatment costs and \$ 145 billion in loss of productivity in the 72 countries supported by GAVI*.

* International organisation aiming to improve access to new and underused vaccines for children living in the world's poorest countries

Vaccination: incomparably cost-effective

Vaccination is considered the most cost-effective health intervention following water quality. In addition to improving life expectancy, it enables public authorities to make savings. Indeed, treating a patient already affected by a disease, even benign, generally costs one hundred times more than vaccination would have in the first place.

According to the World Bank, improving health contributes to economic growth by reducing the incidence of worker morbidity, making it possible to use natural resources in pathogen-infested areas, increasing school attendance and assimilation rates and freeing up resources that would have been used to treat the diseases concerned.



Veterinary medicines and reagents

France is the European leader in the research and manufacture of veterinary medicines and reagents, employing over 6,700 people and possessing the largest therapeutic arsenal in Europe (2,700 Marketing Authorisations).



The French Association of Animal Health Industry (SIMV) has 40 member

companies employing 6,700 people. Four French companies are ranked among the Top 10 in this sector worldwide. Two-thirds of the products manufactured at its members' 50 French production sites are exported, which represents € 1.2 billion.

France's competitiveness in terms of animal health lies in the density of its industrial, veterinary and professional fabric, in its recognised scientific and technical expertise and in the capacity of its manufacturers to invest in managing networked R&D projects and international projects.

Since infectious diseases can be transmitted within species in many different ways, close collaboration is needed between animal health, human health and the environment.

FRANCE, ESTABLISHMENTS AND PRODUCTS SERVING CUTTING-EDGE MEDICINE

France's network of 2,800 local, tertiary referral and university hospitals provides equal access to health services to the entire population. The staff provide the best possible individually-tailored care without judgement or discrimination while optimising resources and thus contributing to the ongoing quality of its public health system.

Treatment, research and teaching are closely interwoven in the French healthcare system, bringing sophisticated tools and technological innovation to each patient, tailored to their needs. High quality treatment is the result of university-hospital based training of personnel at the cutting edge of international scientific knowledge, innovative advanced technology, multidisciplinary and a global vision of the patient, combined with private community outpatient medicine. It is to France's credit that it has built one of the world's best healthcare systems, something that is regularly reflected in population satisfaction surveys. Recognition also comes from further afield witnessed by the May 2016 special issue of The Lancet, devoted to French healthcare. New personalised healthcare approaches also mean that treatment can be targeted according to the pathology and the person's context. Optimal care pathways are developed from the first very signs of illness to include all the healthcare and social factors involved.

Patient outcome is not the only consideration. France has a quality control system, overseen by its National Health Authority (HAS). For more than 20 years now, public and private healthcare establishments have been required to undergo



Institute of Cancer Research in Western France (ICO), Nantes

certification every four years to ensure that their procedures and professional practices meet quality criteria. An equally essential role is played by the country's health safety agencies, which work to ensure optimal quality of healthcare.

Lastly, France has a leading pharmaceutical and vaccines industry.

In response to the requirements of the population and society,

this excellence is also based on integrated offerings in terms of public health and management. It is a solution endorsed by everyone concerned – industrial and commercial companies, research consultancies, hospitals and research centres, with the support of the public authorities – to better meet the health and healthcare expectations of the international community and all of France's foreign partners keen to benefit from its extensive know-how.

HEALTHCARE ESTABLISHMENT STRONGLY INVOLVED



France's public hospitals account for 65% of short-stay activity, 52% of conventional surgery, 32% of outpatient surgery, 82% of medical activity, 40% of aftercare and rehabilitation, 70% of psychiatric activity and 83% of emergency treatment.



Well-organised private hospitals: 1,000 private hospitals in France annually account for 8.5 million patients, 57% of surgical procedures, nearly 68% of outpatient surgery, one in four births, nearly one-third of aftercare and rehabilitation and more than 17% of psychiatric hospitalisations.

With its national experience built on the excellence of its practices and its organisational and management know-how, the private hospitals sector has much exportable expertise:

- Construction from the ground up and management of healthcare establishments
- Training of hospital teams to pass on skills acquired in specific practices
- Advice on healthcare provision, hospital financial resource management, establishment of efficient governance, improvement of patient care pathways, medical projects, quality and safety of care, etc.

French private hospitals already have international experience acquired through inter-hospital cooperation and the development of affiliates and networks. The private sector intends to continue to promote the French healthcare system by placing its recognised know-how at the service of international stakeholders.



UNICANCER is the umbrella organisation for all the French Comprehensive Cancer Centres (FCCC): these private non-profit health establishments are exclusively devoted to treatment, research and teaching in oncology. A truly French concept, the FCCCs are present throughout the country. They strongly contribute to the excellence of French healthcare in the treatment of cancer. Many of UNICANCER's innovations and proposals have been used in French cancer plans and then extended to include all healthcare establishments.

Their expertise is recognised by the French public authorities.

Alone or in association with other healthcare establishments they operate:

- 15 out of 24 geriatric oncology units,
- 6 out of 8 centres for adolescents and young adults,
- 8 FCCCs are coordinators for rare forms of cancer out of 17 healthcare establishments identified in France,
- 2 trials out of 5 for the 'personalised post-cancer programme'.

Their expertise is recognised by the French public authorities. Alone or in association with other healthcare establishments they operate:

- training of healthcare professionals,
- scientific partnerships,
- assistance with opening oncology centres and services, inspired by the FCCC model.

UNICANCER IN FIGURES

20 centres dedicated to cancer

18,000 employees

€ 2.1 employees

Over **300** clinical trials ongoing

Over **120,000** patients hospitalised each year



Federation of Private Non-Profit Hospitals

The French Federation of Private Non-Profit Hospital and Social Care Establishments (FEHAP) is the reference federation for the private non-profit sector and has been present in every field of social welfare since its creation in 1936. Private non-profit establishments and services combine a public service mission with a private mode of management, and work in the interests of social utility and the common good. Their missions are to guarantee access to healthcare, treatment and support for everyone and to ensure the lifelong continuity of care and treatment of all pathologies, handicaps and loss of autonomy.

In figures, the FEHAP represents some 4200 health, social and medical-social establishments and services run by more than 1600 managing bodies (associations, foundations, congregations, non-profit complementary health insurance companies, complementary-pension and life risks funds [incapacity/invalidity/death coverage]), more than 246,600 beds/ places, and 230,000 professionals for 2.5 million people accommodated each year.

* Source: French Hospitals Federation (FHF)



Hospital at Home (HaH) is a specific form of management in which the quality of hospital care is combined with the comforts of home. With over 300 establishments across the country, HaH in 2015 accounted for 105,000 patients, 4.6 million days and provided comprehensive and coordinated multidisciplinary medical, nursing and psychosocial care to patients with serious, acute or chronic diseases.

This specific know-how in the evaluation and coordination of healthcare makes HaH an essential response to the challenges posed to the French healthcare system (and an interesting experiment for many other countries facing the same challenges), namely:

- Demographic and epidemiological, with population ageing and the increasing proportion of people with chronic diseases.
- Societal, with patients and their relatives increasingly wanting them

to remain at home.

- Economic, with the need to better allocate funds, particularly public funds, avoiding hospital stays when they are not absolutely necessary (although local technical platforms and ongoing monitoring would be needed instead).

The FNEHAD, which federates 240 establishments of all types (public, private and private non-profit) and accounts for more than 90% of at-home hospitalisation time, is devoted to promoting and developing this form of healthcare, which for the present is underutilised in France.

AT THE SERVICE OF DIGITAL HOSPITAL DESIGN AND CONSTRUCTION

The financial constraints involved in the renovation or construction of hospitals mean that strategic decisions must be based on organisational models that are tried and tested in terms of healthcare quality and cost-effectiveness while incorporating the latest Information and Communication Technologies (ICT).

With the experience acquired from the design and construction of the ten hospitals built in recent years, France is well-placed to offer solutions for the effective organisation of many hospital processes, whether medical, medical-technical, logistic or housekeeping-related. France has all the expertise and know-how required to optimally structure healthcare provision across a given territory, as well as to deliver turnkey hospitals designed to satisfy patient needs first and foremost, taking into account their individuality and the new possibilities offered by a more personalised form of healthcare.

A few examples of countries that have benefited from French expertise:

- Vietnam (Hanoi University Hospital): French Cooperation Agency for Health Care Services Development (ACODESS) and Paris Public Hospitals Group (AP-HP)
- Morocco (countrywide hospital modernisation plan): Sofreco, Antarès Consulting
- Abu Dhabi (Cleveland Clinic): Oger International, Leader Health
- China (Beijing's Xie-Hie Hospital, Zhuhai's Mother and Child Centre, Huzhou's General Hospital): AIA and associates.

Through the creation of consortiums of major companies to conduct design, build & maintenance projects and through the provision of funding in various legal forms where necessary, France offers not only an architectural context that takes the identity of each project into consideration but also an operating framework that can be adapted to the culture of each country and includes the most recent biomedical and IT technologies.

France offers a panel of digital solutions for each of the processes involved in running a hospital. Based on two major principles, namely the IP multimedia network and the nationally shared electronic patient record, IT solutions evaluated by experts for their return-on-investment value, can be proposed for each of the four components of a digital hospital that correspond to the international state-of-the-art: the connected hospital, the robot-assisted

automated hospital, the smart building and the eco-hospital.

Using the services of a lead contractor to deliver a turnkey solution means freedom to aim for excellence across the board: user eHealth, telemedicine, use of digital simulation in staff training, geolocation of people and property, paperless offices, programmed care pathways, autonomous outpatient circuits, hybrid operating rooms, robot-assisted operating rooms, networks to access digital imaging, integrated and automated medicine circuits, integrated and automated biology platforms, multiservice bedside terminals, decentralised dynamic storage, automated and robot-assisted handling, pneumatic waste transport, high environmental quality of buildings and infrastructure, centralised technical building management interfaced with maintenance management, digital modelling of buildings, etc.

More generally speaking, at the programming stage, France is able to propose an organisational design that is both medical and logistic, the result of a tried and tested methodology which involves all the local players. The impact on the architecture of the organisational choices made by the client is then taken into account in the conceptual design in which digital simulation tools are used to model flow and volume. The technical definition and scheduling phase calls on the world-renowned know-how of the major French construction companies, the most reputed architects with experience of other countries, major construction and computer engineering companies, consultancies specialising in the management of complex projects and so on.

France does not simply turn out solutions in cookie-cutter fashion – as is the wont of American and European competitors – but delivers modern adaptable architectural packages that enable digital organisations to adjust their offering to the medical and managerial culture of the client country.

« **FOR ORGANISATION AND EFFICACY, THE FRENCH HEALTHCARE SYSTEM IS OFTEN CONSIDERED ONE OF THE WORLD'S BEST PERFORMERS.** »

Due to the changing needs of the population, the fluctuating political and economic context and advances in science and technology, the French healthcare system has been constantly debated, discussed, challenged, reviewed and adjusted over the decades. The two major issues are always involved: how to improve access to treatment and how to reduce costs.

IMPE, the French leader in the provision of turnkey hospitals and the other companies in the sector actively participate in these debates and contribute to the improvement of healthcare systems by developing innovative solutions to meet the requirements of the emerging countries concerned.

Their experience on the international scene, illustrated recently when IMPE was awarded the contract for the Can Tho Hospital in Vietnam, enriches the debate and drives the export of French fields of excellence: hospital infrastructure, information systems, medical devices and equipment, expertise, consulting, regional strategic planning, engineering, construction, programming, running

of hospitals, procurement, training (medical, paramedical, technical and management staff) with the guarantee of top quality and high-level skills. The aim is to provide clients with the analyses and technical documents need to make the best decisions in terms of the design, building, renovation, rehabilitation and equipment of hospitals



A VIEW FROM THE FIELD

ELIANE GLUCKMANN,
Emeritus Professor who
performed the first ever umbilical
cord blood transplantation in 1988



At the service of cutting-edge medicine

Universal access to healthcare is undeniably one of France's greatest assets and the inspiration of other healthcare systems. Many do not possess our experience in the field and numerous countries today are attempting to emulate our healthcare model.

On the professional level, the excellence of our training in terms of research and clinical practice produces undeniable skills. Ours is the country of Professor Jean Dausset, winner of a Nobel Prize for his discovery of the HLA system, Professor Jean Bernard, pioneering haematologist and founder of an internationally-renowned school of thought in haematology, and Professor Jean Hamburger, pioneer in the field of kidney transplants. They invented the university-hospital model in which ongoing ties between hospitals and research are forged.

This is not the case everywhere and the synergies generated by the country's university hospitals are an important asset reflected in the number of international publications by French research teams, long considered to be among the leaders in their fields. More and more young French doctors are opting to spread their knowledge beyond our borders, and are highly appreciated wherever they go. The French physicians who are members of this international elite are reputed for developing cutting-edge medicine which brings new solutions to the four corners of the world. We have brilliant teams that are highly reputed in many

fields. In my specialty, haematology, biological research is now well-integrated in clinical research. This very interesting model is one of the solutions that we must share with others.

Hereditary diseases and biology: French teams always at the top

In haematology and cell and gene therapy, we are historically the leaders in clinical research in a field that I know well. This French leadership has meant that we are ahead of other countries in paediatric hereditary diseases, helped by the performance of an increasing number of umbilical cord blood transplantations, a field in which I have published over 850 articles in the most prestigious international journals. While publication makes it possible to share scientific advances, we can go much further than that. We cannot keep our discoveries to ourselves and the development of our teams on the international level has been natural and spontaneous.

« **THE CHALLENGE IS TO ADAPT TO LOCAL CONDITIONS, SOMETHING THAT THE FRENCH TEAMS DO WITH GREAT SKILL. THE FRENCH MODEL IS ADAPTABLE, IT IS OUR OBJECTIVE AND OUR STRENGTH. »**

In terms of innovative treatments, French solutions are very quick to spread beyond our borders. Our teams have many solutions in the pipeline that are of interest to the entire world. Both in transplantation or genomics, not to mention advances in molecular biology, leading French teams are ready to

share their discoveries. The new molecules derived from research are rapidly becoming essential. Cell and gene therapy, particularly in haemoglobin disorders, are areas in which France is particularly strong and can further share its knowledge. It is totally new and the French teams are very much ahead in this field. Our knowledge of umbilical cord blood has propelled us to the global forefront. As I speak, we are conducting highly promising research into genetic diseases of haemoglobin related to sickle-cell anaemia.

« **OUR GOAL IS TO ESTABLISH
CENTRES OF EXCELLENCE
THROUGHOUT THE WORLD. »**

The challenge does not only lie in exporting our knowledge to developed countries but also to developing countries. With centres of reference being set up in the subtropical countries, French teams are bringing new solutions to Africa, Brazil and other emerging countries. In sickle-cell anaemia, a pathology classed by the WHO as being a major public health concern, our solutions are also eagerly awaited in the United States and South America. The aim is to structure healthcare, from diagnosis to treatment, by sharing the possibilities that gene therapy offers. Today, our knowledge coupled with expertise in healthcare organisation is crossing national borders to provide the most comprehensive and human response possible from a technical viewpoint.



Efficient systems to assist ageing dependents

When it comes to assisting ageing dependents, France has developed an efficient system divided up between the public and private sector and associations. At present, 560,000 people reside in 7,000 establishments assisted by 330,000 specialist professionals. With their recognised expertise in the field, French private companies are considered to be among the leaders of the sector at European and even global level. Now established in Belgium, Czech Republic, Germany, Italy, Poland, Quebec and Spain, these companies are at the forefront in the emerging markets, especially Asia with the recent inauguration of their first establishment in China.

To showcase the country's know-how and stimulate innovation, France launched its *Silver Économie* industrial sector in 2013. The innovation concerns both technology and the creation of a type of elderly care coordination, called the *Parcours de la Personne âgée*, in which each person, upon reaching retirement, can choose the type of accommodation, services and assistance best suited to their needs, wishes and pocket. Solutions include home care services, retirement communities (*Résidences Services Seniors*) and nursing home care (EHPADs). The *Parcours de la Personne âgée* ensures fluid transition between each stage in the life of the elderly person and consistent coordination between stakeholders to contribute to ageing well under the best conditions.

At the service of ageing dependents

Silver Économie is a neologism that appeared in the official vocabulary in 2013 when Arnaud Montebourg and Michèle Delaunay, respectively French Minister of Industrial Renewal and French Minister Delegate with responsibility for the Elderly at the time, created a *Silver Economy* industrial sector with its accompanying committee, responsible in turn for respecting an industrial sector contract.

Ensuring that technological and digital advances improve the daily lives of increasingly-dependent seniors is a challenge for which there are currently a number of solutions. Fall detectors, automatic pathway lighting, adjustable-height furniture, connected pillboxes, health monitoring apps, so-called "serious games" used to prevent memory loss and systems such as Skype, which are used to stay in contact with children and grandchildren, are all part of the technological progress that contributes to a better anticipation and facilitation of the ageing process.

France Silver Éco, an association of public and private sector service providers, was established in 2014 to promote the cause of a Silver Économie, source of growth, jobs and innovation at home and abroad.



However, the *Silver Economy* has a second dimension, which corresponds to the efforts made by economic stakeholders to adapt to their ageing consumers and thus broaden the range of what they can offer. For example, banks can offer reverse mortgages, the transport industry can offer mobility solutions, builders can adapt accommodation, elected representatives can rethink town planning, insurance companies can provide specific complementary health insurance and dieticians can provide nutritional advice.





MEDICAL TECHNOLOGIES: A DYNAMIC FRENCH INDUSTRY

France: at the forefront in medical devices

- **4th** leader worldwide and **2nd** in Europe. A market evaluated at € 20 billion.
 - More than **1,000** medical device manufacturers, 94% of which are SMEs (with 45% VSEs and 2% middle-market). Spread across the entire country (75% can be found in the regions of Ile-de-France and Rhône-Alpes).
 - Many French middle-market companies at the cutting edge of medical devices both in France and abroad (contrast media, heart valves, orthoses, infusion equipment, wound care).
 - **65,000** jobs in France.
 - Strong development potential,
- particularly due to innovations and the development of eHealth.
- France, known for its excellence in healthcare: major R&D collaborative potential thanks to university hospital laboratories and major research organisations (CEA, CNRS, INRIA, Inserm, etc.); **76%** of companies in the field have R&D activities.
 - Approximately **6%** of turnover invested in R&D by medical device companies established in France with research and/or production activities.
 - **1** in **3** orthopaedic implants is made in France.
 - France ranks **5th** for the number of European and international patents filed and represents **10%** of the patents filed in Europe. In the medical devices sector alone, more than **600** patents are filed in France each year, i.e. **1.6** per day.



MANY WORLDWIDE FIRSTS ACHIEVED IN FRANCE

- **1st** total hip replacement without cement (1970)
- **1st** implanted insulin pump (1981)
- **1st** coronary stent (1986)
- **1st** computer-assisted open heart surgery (1998)
- **1st** use of an artificial pancreas (2011)
- **1st** implanted artificial heart (2013)...



MEDTECH IN FRANCE WHAT IS A MEDTECH?

**Medtech In France.
The French champions of
medical devices.**

France has over fifty medtechs, all members of the association MedTech in France, whose aim is to be a driving force in the French innovative technologies sector.

Among these companies that are revolutionising healthcare are innovative companies in the fields of artificial hearts, artificial retinas, optic biopsies, the ultrasound treatment of tumours, low-dose X-ray imaging, stents, technologies used in spinal surgery, robotics and innovative telemedicine solutions.

These innovations produced by French medical research are already recognised throughout the world – over 90% of the turnover of these medtechs is generated abroad.

They will have a triple impact: a medical impact on the patient, an industrial and economic impact on the country and an organisational impact on the healthcare system.



Artificial heart created by the company CARMAT

France: in pole position in artificial organs

The quest for artificial organs began at the end of the 19th century, with attempts to develop “breathing machines”, capable of replacing deficient lungs. The challenge today is obviously enormous: solutions must be found as quickly as possible to save patients awaiting transplantation, given the shortage of organ donation (there is a shortage of over 12,000 organs each year for people awaiting heart, kidney, liver or lung transplants) and the risk of rejection.

Each year in France patients are fitted with more than:

- 1,200 thoracic aortic stent grafts
- 7,000 abdominal aortic stent grafts
- 15,000 implantable cardioverter-defibrillators
- 25,000 heart valves

It has taken 25 years of research to create an artificial heart*, the first of which was implanted in a patient at the end of 2013. Offering a real alternative to transplantation, this technological feat is an innovation that is 100% French. This artificial “smart heart” capable of fully reproducing the physiology of an actual human heart contains sensors supplying information that makes it possible to adapt to variations in activity. It is the result of synergies between medical know-how and engineering in biomaterials, micro-mechanics, hydraulics, electronics, etc.

France has also been a pioneer in the development of an artificial pancreas, developed by Diabeloop. A true ‘pancreas 2.0’, intelligent and perfectly autonomous, it is capable of measuring blood glucose and directly controlling the pump that will deliver the correct dose of insulin to the patient. This represents an immense hope in terms of autonomy, safety and quality of life for patients with diabetes and could begin to be marketed in Europe at the end of 2017.

* CARMAT

SNITEM: a professional organisation representative of the sector

Set up in 1987, SNITEM (French trade association of medical devices) is the first professional organisation to represent a majority of the medical device and the Healthcare Information and Communication Technology (Healthcare ICT) industries. It has 400 members, many of which are SMEs.

An example of an integrated offering: diabetes

In 2030, it is estimated that 550 million people, particularly in the USA, India and China, will have diabetes, a disease that can lead to foot ulceration and possible amputation. A programme called AKEOME is currently being conducted by a French company focusing on the healing of diabetic foot ulcers, a pathology for which no product in the world has yet demonstrated real clinical efficacy. This € 50 million programme received the support of Bpifrance in 2016.

France has several frontline players in the field of diabetic medical technologies: blood glucose measurement, the artificial pancreas

project, prosthetics and the treatment of diabetic foot. All of these are exportable innovations.

The medical imaging industry

Medical imaging is a medical specialty designed to orient and confirm diagnosis and/or guide therapeutic procedures. It is a key discipline used by many other specialties. It is also highly innovative and will play a major role in the development of preventive and personalised medicine. Beyond its traditional uses in diagnosis and therapeutic monitoring, it is also entering the field of treatment, such as interventional radiology, using techniques that are less invasive than those of traditional surgery. In addition, it is a potential source of cost reduction, particularly in hospitalisation expenses.

Since its invention at the end of the 19th century, medical imaging has contributed actively to medical progress. During the second half of the 20th century, medical imaging techniques diversified and currently cover radiography and CT scanning, MRI, ultrasound and nuclear medicine. MRI, ultrasound and nuclear medicine.



Diabetic insulin pump

IN FOCUS
FRANCE'S PRODUCTS
AND TECHNOLOGIES

In France, some 250 companies make up the fabric of the medical imaging sector, employing approximately 40,000 people. The majority of these companies focus on X-ray, MRI or light-wave methods. One of them, among the sector's four world leaders, has research and production facilities in France and sells a comprehensive range of products across the globe, including contrast media for X-ray, MRI imaging and interventional, and the corresponding injectable solutions.

A world leader in imaging equipment is also firmly established in France.

eHealth: a rapid-growth sector

The French digital health industry is a dynamic sector representing 30,000 jobs and a € 3 billion market. It includes companies that provide long-established solutions (such as hospital information systems and software for health professionals), as well as start-ups, SMEs and major groups positioned in more recent sectors of activity which are currently experiencing major development (especially connected objects and mobile health applications, telemedicine solutions and treatment coordination platforms).

France has all the assets and advantages needed to sustainably play a leading role in this sector and provide the population with access to high added-value eHealth services: cutting-edge industrial solutions often co-developed with medical teams of excellence

recognised on the international level, widespread use of digital solutions within the population and in healthcare processes. Major national projects (particularly the *Carte Vitale* electronic insurance card, shared patient medical records and shared patient pharmaceutical files). Several recent initiatives support the sector's strong development, including the publication in July 2016 by the French government of its strategic roadmap for the development of eHealth between now and 2020.



In October 2015, the companies supplying eHealth solutions formed an umbrella association, via their professional organisations, called *Alliance eHealth France*, to work towards developing the sector and promoting it in France and abroad.

Diagnostics: a dynamic industry for quicker and safer treatment

The companies that form the in vitro diagnostics industry design, develop, manufacture and market the tools, reagents and databases used to analyse and obtain information about the patient from samples of biological fluids.

A key link in the healthcare chain

60 to 70% of medical decisions are based on the results of in vitro diagnosis.

The figure rises to 80% for decisions made in the hospital environment.

The in vitro diagnostics industries form a major sector of the French economy. They include national champions on the worldwide scale and have a strong capacity for innovation.

In a context of controlled health spending and attractive markets in emerging countries, the sector has successfully adapted its offering, its organisation and the skills of its employees, whose level of training is one of the highest in the industry.



Performed in public and private centralised laboratories, medical practices or by the patients themselves, biomedical analysis has benefited in recent years from scientific progress in terms of biological systems and the pathophysiology of diseases.



Telemedicine booth



There are about one hundred French companies dedicated to this sector. Just over a third of them have development and production facilities in France.

These companies which include several major manufacturers of world renown and a number of successful SMEs, which represent 90% of the sector, produce 7,000 out of the 40,000 in vitro diagnostic devices produced in Europe, making France the second largest producer in Europe. These companies reinvest 11% of their turnover in R&D.

The French manufacturers generate

80% of their turnover through export. In the reagents segment alone, the French in vitro diagnostics industry contributes € 1.5 billion to the trade balance.

The in vitro diagnostics industry represents approximately 12,000 direct jobs in France and over 60,000 indirect jobs.

Strong potential for future development in this field, thanks to:

- its ability to fundamentally change medical practices and their cost,
- the unique and essential position it occupies between clinical practice and clinical research,

- the emergence of new analysis and communication technologies that reduce analysis times and even allow real-time and long-term monitoring using embedded sensors (high-throughput sequencing, mass spectrometry, point-of-care tests, microfluidics, nanotechnology, automation, wireless communication, embedded microsystems and microsensors, communication by telephone operator, etc.),
- the expectations raised by the analysis of humans through systematic biological approaches (genomics, metabolomic proteomics, etc.) and bioinformatics (in silico biology, systems biology, etc.).

France has the second largest number of in vitro diagnostics producers in Europe.

These producers play a major role in providing reagents to deal with the appearance of emerging diseases. Three months after the Ebola crisis occurred in Western Africa, a French SME was able to offer a simple, rapid screening test thereby helping to contain the epidemic.

THE GLOBAL IN VITRO DIAGNOSTICS MARKET IN FIGURES

- **€ 50** billion, i.e. **5%** of the world healthcare market (pharmacy, medical devices, in vitro diagnosis).
- The European market (**34%** of the world market) is the second largest, not far behind North America (**43%** of the world market)
- The French domestic market represents **4.5%** of the world market and **17%** of the European market with an estimated value of **€ 1.8** billion.

THE FRENCH MODEL: UNIVERSAL ACCESS TO HEALTHCARE

France has established a world reputation for exceptionally high quality healthcare and life expectancy. The cost-effectiveness of its healthcare is also one of the best in the world. Although the price control system is very patient-oriented, the industry remains competitive. Considerable importance is attached to the pertinence of medical and surgical procedures and to the economic performance of management.



Irrespective of a country's health insurance system, France can provide concrete solutions for building relevant, efficient health insurance schemes. France has successfully met the challenge of providing universal healthcare while balancing the budget.

UNIVERSAL HEALTHCARE BASED ON SOLIDARITY

The French health insurance model is based first and foremost on public health insurance that is shared by the entire population. French social security plays a major role in ensuring the nationwide sharing of resources and funding, by guaranteeing coverage of the major health risks. This is the most efficient way of ensuring equal access to healthcare across the country.

For hospital care and medicines, the various health insurance funds and the State control the price of healthcare in order to avoid

excessive increases while preserving the investment capacities of the healthcare providers. As a result, the out-of-pocket expenditure of French households is among the lowest in the world, while the level of quality of healthcare is very high and its accessibility is exceptional.

In terms of access to treatment, the French system, which is very open, is based on the patient's freedom to choose between public and private healthcare facilities and also to choose their own primary-care physician. In return, private practitioners accept the regulation of their fees, which are usually the subject of negotiation.

This liberal approach to access to private or public facilities and to the entire healthcare profession under very acceptable financial conditions is one of the characteristics of the French system that has contributed to its success.

In addition to universal public health insurance, the French system also comprises private complementary health insurance, which is very widespread. It offers a fair compromise between the need for healthcare operators and insurers to make a profit and the quality and affordability of treatment.

AN ORIGINAL COMBINATION OF COMPULSORY AND COMPLEMENTARY HEALTH INSURANCE

In France, compulsory public health insurance currently covers about 75% of total healthcare costs while complementary insurance covers 15%. The remaining 10% is paid by patients, which, on the whole, allows them to access quality healthcare at reasonable prices. This combination of compulsory and complementary solutions may seem somewhat original.

In the event of major or chronic illness, treatment is fully covered by compulsory public health insurance, while more routine healthcare, which is partially funded by complementary private insurance, still remains very accessible. This societal choice in France is quite unusual and represents a departure from traditional models in which the public and private sectors are strictly segmented. The French model is more nuanced and guarantees more freedom of choice in the event of ill health. By complementing each other (and sometimes competing with each other), public and private healthcare insurers work together innovatively. Access to the private hospital sector always remains possible, without distinction.

A TECHNICALLY INNOVATIVE MANAGEMENT SYSTEM

To facilitate the exchange of data, France has for the past 15 years been using the *Carte Vitale* electronic insurance card system, which is a particularly innovative. The *Carte Vitale* is a smart card designed to instantly identify patients being treated by healthcare practitioners and whose healthcare is covered by compulsory and complementary

insurance systems which can thus securely exchange data.

Payments and reimbursements are electronic. Thanks to paperless invoices and claim forms, the patient reimbursement process has become extremely efficient. Soon, the *Carte Vitale* will provide patients with direct access to their compulsory and complementary healthcare coverage in real time and enable health professionals to identify card holders. The widespread use of the card will provide on-line access to coverage and perfect synchronisation of data flow.

SECURE NATIONAL HEALTHCARE PROGRAMMES

A leader in the field of digital security, Gemalto participates in over 100 government programmes. Its experts contribute to national discussions on how to improve IT systems, particularly in terms of preventing fraud and reducing errors.

With a 2015 turnover of € 3.1 billion and more than 14,000 employees, Gemalto provides its public and governmental partners with the assistance, information and the means needed to successfully upgrade their organisations and processes.

For 20 years, Gemalto has been providing efficient solutions to protect:

- the identity of users through identification and authentication,
- the personal data of users through data encryption,
- transactions

Gemalto has provided technical solutions for 11 national eHealth systems that are currently in

operation, particularly in Algeria, Azerbaijan, France, Gabon, Germany, Italy, Slovenia and Sweden.

ADMINISTRATIVE MODERNISATION OF THE HEALTH SYSTEMS

When streamlining administrative tasks, particularly by reducing the number of intermediate steps, it is not enough to introduce paperless transactions. Access to healthcare, patient registration and reimbursement must also be made easier.

The next stage in restructuring the relationship between patients, healthcare professionals and public sector representatives is clearly the introduction of digital transaction technologies and the creation of electronic health cards.



With these cards, healthcare professionals can access a patient's administrative and medical information anytime anywhere, thereby eliminating the risks related to emergency situations and optimising the quality of services. This technology makes it possible to improve healthcare systems over the long term, as well as combat fraud, corruption and cheating the system. Fraud in healthcare and social security systems is a growing concern worldwide because it threatens their sustainability.

Studies conducted by the European Healthcare Fraud and Corruption Network (EHFCN) show that the strong identification of patients and



EXPERTISE FRANCE WHAT DOES IT MEAN?

Expertise France, the French International Technical Assistance Agency, is the country's public agency for international technical cooperation.

Expertise France has four priorities: democratic, economic and financial governance; stability and security of countries in states of crisis or post-crisis; sustainable urban development and the fight against climate change; reinforcement of healthcare systems, social protection and employment. In these various fields, Expertise France develops and implements capacity-building projects, mobilises technical expertise and oversees turnkey projects combining public expertise and private know-how. With a volume of operations of € 115 million, over 400 projects carried out in 80 countries and 63,000 man-days of expertise provided in 2015, Expertise France reflects the French policy of solidarity, influence and economic diplomacy.

healthcare professionals is a major factor in overcoming these problems: 'The key message is first of all the need for strong identification, in order to answer the question "who is paying for whom and for what?". This will result in more rational health spending, easier checks and subsequently a more sustainable social security system. It would be delusional to believe that healthcare can remain anonymous.' The Algerian National Fund for Social Security for Salaried Workers (CNAS).

EXPERTISE FRANCE: FRENCH EXPERTS SERVING INTERNATIONAL COOPERATION

To contribute to the capacity building of its partner countries, France's reference public agency for international technical cooperation, working closely with these countries in a joint approach, designs, develops and implements development cooperation projects and programmes, particularly in the field of healthcare.

« THE CREATION AND
IMPLEMENTATION OF
DEVELOPMENT COOPERATION
PROJECTS, FOCUSED ON THE
TRANSFER OF KNOW-HOW BETWEEN
PROFESSIONALS.

Priority to reinforcing healthcare

Expertise France aims to **reinforce the capacity** of its partner countries to pursue healthcare policies that are both sustainable and efficient. The agency **prioritises cross-cutting healthcare system reinforcement** of all components (service provision, health-product management and procurement, health information systems and governance, with the

emphasis on human resources in health).

In the context of international and French **universal healthcare coverage**, the agency is developing specific projects on healthcare funding and access to treatment.

Founded in January 2015, Expertise France

- Contributes to sustainable, inclusive and mutually-supportive development, mainly by reinforcing partner-country public policy quality.
- Builds the capacities of its partners in terms of defining and implementing public policy suited to the needs of the populations concerned. The agency thereby contributes to implementing French foreign policy objectives of development cooperation, influence and economic diplomacy.

Inter-hospital cooperation is a form of sustainable intervention recognised as contributing to the achievement of healthcare objectives. It involves training local staff in primary-care facilities and community organisations as well as high-level specialists in university hospitals. It helps to address needs in terms of prison healthcare, drug addiction, kidney transplants, interventional cardiology, hospital hygiene and the management of medicines.

Developing integrated health projects is also one of the agency's priorities. In Côte d'Ivoire, Congo and Mali, Expertise France, together with the French School of Public Health (EHESP), is

reinforcing hospital governance: from training hospital directors to aiding hospital reform. In Tunisia, Expertise France is accompanying a project to build a hospital and include it in the existing healthcare environment.

A key player in the response to health crises

The recent profusion of health epidemics (SARS, H1N1, MERS-CoV and above all Ebola) and the obvious difficulty for resource-limited countries and the international community to react appropriately have demonstrated the need and relative urgency to redefine and reinforce international health security (IHS).

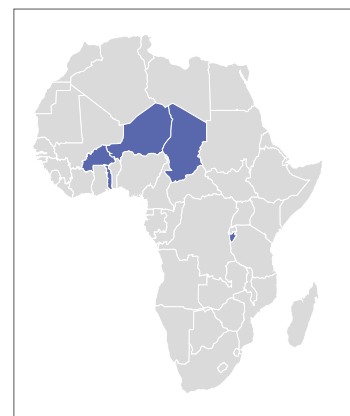
Expertise France is a versatile key operator in ISH and has solid references in the field since the recent Ebola epidemic during which the agency was assigned a € 22 million project portfolio in Guinea, Liberia and the neighbouring countries by the French task force and European Commission.

The fight against pandemics (HIV/AIDS, tuberculosis, malaria) - the original core activity of Expertise France's Health Department - is geographically focused on resource-limited African countries

The **5% Initiative**, managed by the French Ministry of Foreign Affairs and International Development and implemented by Expertise France, was launched at the end of 2011 to give more direct assistance to French-speaking countries receiving Global Fund grants in accessing and implementing programmes to fight AIDS, tuberculosis and malaria.

Other Expertise France activities in healthcare:

- Projects focused on sexual, reproductive, maternal, neonatal and infant health development, a priority objective of Expertise France.
- The fight against addiction (drugs in Senegal and Vietnam, smoking in Burkina Faso).
- Chronic noncommunicable diseases: an ongoing project to strengthen capacities in the field of oncology in Kenya in partnership with the Aga Khan foundation and the Curie Institute. Other projects are in preparation in diabetes and the fight against cancer.



In Burundi, Togo, Niger, Burkina Faso and Chad, among others, the hospital partnerships developed as part of the ESTHER Initiative have been helping to improve the quality of services to people living with HIV for more than a decade.



FRENCH HEALTHCARE



French Healthcare is an innovative initiative aimed at bringing together companies, researchers, and healthcare professionals to jointly promote their activities internationally.

The brand French Healthcare has an ambition: To build momentum through a collective approach so as to boost the influence of French health know-how and technologies.

Showcasing French assets

France has considerable assets:

- Its public health and training model enjoys international recognition.
- It is a leading player in global healthcare.
- French research and the French pharmaceutical industry are among the most successful in the world.
- It has a proven capacity for innovation in the medical device, animal health, e-health, and silver economy sectors, which are served by a dynamic ecosystem of start-ups and SMEs.

French Healthcare will promote all these assets worldwide.

A public-private initiative bringing together all healthcare stakeholders

Developed as part of the government strategy to support priority export "families," French Healthcare is an initiative of the Healthcare Industry and Technology Strategic Committee (CSFITS) designed to improve the visibility of French health services for export.

The French Healthcare initiative is supported by public and private stakeholders and is based on close collaboration between:

- The Ministries of Foreign Affairs and International Development, Economy and Finance, Social Affairs and Health, and National Education, Higher Education, and Research.
- Operators (Business France, Expertise France).
- Professional bodies and trade associations.
- Companies, hospitals, research institutes, innovation centers, and universities.

Concrete objectives in favor of the promotion of French healthcare sectors

French Healthcare will allow healthcare stakeholders, grouped in an ad hoc structure:

- To benefit from dedicated communication campaigns (publications and promotional events), developed collectively to promote their know-how, products, and services.
- To welcome foreign delegations wishing to discover the French healthcare model, plus French expertise and technological solutions.
- To participate in joint projects for export designed to strengthen health systems, improve access to care, and fight infectious and chronic diseases.

<http://frenchhealthcare.fr/>
contact@frenchhealthcare.fr

Under the high patronage of:



Our founding members are:



CONCLUSION



MARC DE GARIDEL

Vice President of the French Healthcare Industries and Technologies Strategic Committee

The many facets of healthcare selected for this brochure illustrate France's wealth of assets in a sector of fundamental importance to the lives of people throughout the world and the countries in which they live. No economic or social development is possible without universal access to satisfactory health. French healthcare is particularly comprehensive, starting with the research that is essential to high-level expertise and the ability to respond rapidly to emerging diseases and including the organisation of healthcare

and patient management whose quality is internationally-recognised, know-how in management of healthcare establishments, the evaluation of products and technologies and the implementation of health-insurance systems.

France combines universal access to healthcare with excellence in medicine based on decades of experience while remaining at the cutting edge of scientific knowledge. Another asset is the complementarity of its stakeholders: administrations, public research

organisations, companies of every size working in every field, public and private hospitals, doctors, nurses and carers in private practice, public, private non-profit and private insurance organisations and patients associations, all of which enable French healthcare to adapt to a wide variety of expectations and requirements, in countries with backgrounds and organisations that are often very different. France has a longstanding tradition of openness, which today is reflected in the desire to share expertise and know-how that are in keeping with its values.

Under the umbrella of the French Healthcare Industries and Technologies Strategic Committee

Each strategic committee (CSF) which corresponds to a strategic sector of French industry, is tasked with jointly defining, by means of 'industry contracts', the key challenges of the sector concerned and the reciprocal commitments between industry stakeholders and the State, as well as defining proposals for concrete action and tracking their implementation.

The French Healthcare Industries and Technologies Strategic Committee is presided by the Minister in charge of Industry and the other ministers concerned namely those in charge of Health, Research and Foreign Trade. Steered by a Vice-President from the sector concerned, Marc de Garidel (Ipsen), the committee is comprised of industry stakeholder representatives, companies and industrial federations, the five union organisations, the various administrations concerned and experts.

Public health is one of the major societal challenges facing countries today. With population ageing, the development of multifactorial and chronic diseases, the resurgence of infectious diseases and the growing economies of the emerging countries, demand for healthcare solutions is evolving very rapidly. With this alliance of public-authority and private-sector stakeholders within the French Healthcare Industries and Technologies Strategic Committee, France is well-equipped to face the challenge.

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List of the principal websites of the federations and administrations:

www.ariis.fr
www.aviesan.fr
www.businessfrance.fr
www.diplomatie.gouv.fr
www.economie.gouv.fr
www.enseignementsup-recherche.gouv.fr
www.entreprise.gouv.fr/conseil-national-industrie
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www.fehap.fr
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www.fnehad.fr
www.france-silvereco.fr
www.G5.asso.fr
www.leem.org
www.sidiv.fr
www.snitem.fr
www.sociale.sante.gouv.fr
www.unicancer.fr
www.competitivite.gouv.fr







Under the umbrella of the French Healthcare Industries and Technologies Strategic Committee, chaired by the Ministers of Foreign trade, Research, Industry and Health