

PRESS RELEASE

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## HEALTH 2030

### How can we best prepare for future innovations to ensure good healthcare in 2030?

Leem is publishing its foresight analysis to address tomorrow's health challenges

**Digital twins to test medicines virtually before prescribing them to individual patients; genetic mapping of a tumour in a matter of seconds before entering an oncologist's consulting room; use of artificial intelligence to analyse each cell ... the pictures conjured of our treatment prospects in 2030 are highly appealing. But how far removed are they from future reality? And how are we to adapt our healthcare system to incorporate these innovations?**

To find out, more than 30 renowned experts have shared their vision of the newly emerging world of health : a more advanced world certainly, but also a more complex and interconnected one through which France as a whole and pharmaceutical companies in particular must forge a path to ensure that all patients have access to the best care and are able to guard against disease.

The large-scale foresight project "Health 2030" was undertaken by Leem in conjunction with the Think Tank Futuribles with a view to forecasting major changes brought about by the accelerated pace of innovation not only in the technologies used to treat us but also in the very organisation of the healthcare system itself and in our society's understanding of health and healthcare.

#### The unfolding revolutions

By 2030, the face of France will have changed profoundly: its population is expected to reach 70 million, 80 % of whom will be living in urban areas. The over-65s will account for one-quarter of the population and will have an average of 4 to 6<sup>1</sup> health conditions. Our healthcare system will need to support and care for 1.4 to 1.7 million dependent elderly people and manage a projected increase of 50 % from today's level in the number of patients with long-term conditions.

*"At a time when our system is being overhauled by the Government through the "My Health 2022" project, this foresight work shows that more and more cures will be found for chronic diseases and that deadly diseases will become chronic. It is here that the major transformational challenge of our healthcare system lies",* according to Philippe Lamoureux, Director General of Leem.

How is the healthcare system to be adapted to these major revolutions?

In an effort to provide some answers, the "Health 2030" experts took medical advances and needs into account along with the major environmental challenges, societal changes and sweeping technological changes that are taking place. They structured their thinking around 12 major diseases and 14 drivers of innovation which they believe will shape advances in research and diagnosis.

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<sup>1</sup> Source: *Think Tank Matières Grises*, September 2018

Environmental and societal challenges	Drivers of innovation	Therapeutic challenges
ageing population, climate change, urbanisation, obesity, pollution, addiction, stress, antibiotic resistance in bacteria, social network development, Internet of things and societies of control, Limited resources...	CRISPR-Cas9-mediated DNA modification, epigenetics, microbiota, microfluidics, nanomedicine, regenerative medicine, gene therapy, immunotherapy, vaccination, health data, artificial intelligence, integrative approach of advanced technologies, integrative medicine, Patient autonomy.	cancer, cardiovascular diseases, autism, depression, diabetes, Alzheimer's disease, Parkinson's disease, rare diseases, liver diseases, HIV-AIDS, multiple sclerosis, vision disorders.

### Curing cancers and neurodegenerative diseases: France's top two priorities in 2030

According to a survey conducted by Leem in August 2018, the French see curing cancer and Alzheimer's disease as the top two priorities for 2030. In France, 400,000 cancers are diagnosed each year and are responsible for 161,000 deaths. Alzheimer's disease affects 900,000 people at present.

The situation looks promising in treatment terms. 2030 will see new treatments and new treatment combinations come on-stream as a result of some 3,463<sup>2</sup> clinical trials under way in the field of cancer and 129 trials for neurodegenerative diseases. Even assuming that only one-tenth of these developments actually culminates in a new medicinal product available to patients, innovations are set to increase in pace and number at an exceptional rate in the years ahead.

Already now the immunotherapies used **in cancer** are able to treat certain metastatic cancers (melanoma, lung) and achieve remission rates that were previously unimaginable. Meanwhile, CAR-T cell therapy is effective in the treatment of lymphoma and acute lymphoblastic leukaemia ... And things will not stop there.

**By 2030, cancer management** will benefit from new artificial intelligence-driven decision-making algorithms that will significantly improve diagnosis; combined immunotherapies, epigenetic therapies and targeted treatments will be offered to patients on a case-by-case basis; finally, in an effort to understand the mechanisms behind the development of cancer, an atlas will serve as a compendium of knowledge acquired from a therapeutic and integrative perspective.

**As for Alzheimer's disease**, the experts of the "Health 2030" report expect that by 2020 it will be detectable years before onset.

**And by 2030**, risk biomarkers will be routinely used for **Alzheimer's disease**. We will also have gained the scientific and medical knowledge needed to understand this disease. The advent of effective treatments is heralded and 2030 will thus see the development of preventive strategies.

The experts conducted the same foresight exercise on 10 other major diseases as they did on these two diseases. By 2030, a constant stream of innovation in medicines, medical devices and technology will revolutionise the prognosis of deadly diseases. The first drugs to treat NASH (human fatty liver

<sup>2</sup> Clinical trial figures are sourced from Leem's Innovation database. April 2018.

disease) are expected to come on-stream, as are the first cell therapies to address AMD affecting sight, increasing numbers of gene therapies for rare diseases, tailored treatments to counter multiple sclerosis and Parkinson's disease, and perhaps the first anti-AIDS vaccine ...

THE TECHNOLOGICAL & THERAPEUTIC REVOLUTION		
➤ <i>Multidisciplinarity: combining physics - chemistry - biology - computer science - mathematics</i>		➤ <i>Integration and transdisciplinarity</i>
1980	2000	2030
LIFE SCIENCES DESCRIPTIVE BIOLOGY	LIFE SCIENCES EMERGENCE OF SYSTEMS BIOLOGY	SYSTEMS BIOLOGY AND INTEGRATIVE APPROACH
Explanatory barriers following the surge in molecular biology	Barriers of complexity and processing of mass data	Ethical barriers
Compartmentalization		
<b>TECHNOLOGIES</b>	<b>TECHNOLOGIES</b>	<b>TECHNOLOGIES</b>
<ul style="list-style-type: none"> <li>• Tests, errors</li> <li>• Extrapolation (separate approaches, virology, microbiology, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Experimental techniques and biological information processing</li> <li>• Bioinformatics and computational simulations</li> <li>• Cell imaging</li> <li>• Large-scale genetics (genotyping, DNA chips, etc.)</li> <li>• "-omic" molecular targeting (genomic, proteomic, transcriptomic, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• CRISPR-Cas9</li> <li>• Epigenetics</li> <li>• Microbiota</li> <li>• Microfluidics</li> <li>• Artificial Intelligence/Data</li> <li>• Nanotechnology</li> <li>• Cell therapy</li> <li>• Gene therapy</li> <li>• Vaccines</li> <li>• Immunology</li> </ul>
<b>RANDOM INNOVATIONS</b>	<b>BIOLOGICAL INNOVATIONS</b>	<b>BREAKTHROUGH INNOVATIONS</b>
<ul style="list-style-type: none"> <li>• Combinatorial chemistry, drug discovery process, innovation schools of thought</li> </ul>	<ul style="list-style-type: none"> <li>• Emergence of genetic engineering</li> <li>• Biomedicines: recombinant proteins, monoclonal antibodies, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Nanomedicine, smart pill</li> <li>• Regenerative medicine</li> <li>• Reprogramming</li> <li>• Epidrugs</li> <li>• Immunotherapies</li> <li>• RNA interference</li> <li>• Combined therapies</li> </ul>

The healthcare system will require a root-and-branch overhaul if it is to optimally accommodate such future therapeutic advances: pathways, partnerships, assessments, funding, professions... without neglecting the aspirations of patients and users of the healthcare system who seek higher standards and a personalised approach to their health needs. Armed with their smartphone monitoring apps, genetic information and medical data, the patients of tomorrow will expect, indeed demand, increasingly greater accuracy as users of the healthcare system.

**Leem's "Health 2030" analysis points to the challenges of such an overhaul and sets out the milestones to be met, the obstacles to be overcome and, above all, the tasks to be undertaken in order for France to ready itself for healthcare going forward.**

**The Leem study has identified ten major changes that need to happen if patients are to have sustainable and equitable access to the healthcare treatments and solutions of tomorrow:**

1. Enable access by patients to innovations at the earliest possible opportunity by adopting a more individualized approach to clinical research
2. Better anticipate innovative breakthroughs in order for the healthcare system to adapt as effectively as possible
3. Overhaul the assessment mechanisms and make administrative efficiency gains to enable patients to access innovative treatments more quickly
4. Lead the battle for efficiency as key to ensuring a sustainable healthcare system
5. Measure quality and take account of patient feedback so as to improve treatment
6. Diversify the pricing mechanisms for innovative medicines in order to adapt to innovation profiles and reconcile access with efficiency
7. Create a "Medicine as a Service" model that puts the patient at the heart of the healthcare system
8. Successfully pair healthcare data and artificial intelligence to improve the quality of diagnosis and care
9. Apply breakthrough technologies to the manufacture of innovative medicines from living cells to safeguard the independence of French healthcare
10. Put ethical concerns at the heart of innovation to reconcile research issues with public qualms.

*"These tasks are the necessary building blocks for the overhaul of the healthcare system, concludes Philippe Lamoureux. The basic thrust of this foresight work is to show how innovation in therapy is going to impact the organisation of healthcare and just how urgent it is to overhaul the healthcare system. These sweeping advances in therapy are actually a source of hope for patients, exposing the structural rigidities of our healthcare system and how hard it currently is to absorb these innovations. The choice is still ours: give in or choose the therapeutic revolution. But the biggest challenge we will face by 2030 is to manage alongside all stakeholders in the ecosystem - researchers, clinicians, health authorities, patients, doctors, pharmacists, pharmaceutical companies and start-ups - the transition of the healthcare system towards greater efficiency, higher quality and, above all, equal access to innovative treatments. No longer will the patient have to adapt to the healthcare system but the system to the patient."*

**The "Health 2030" foresight analysis conducted by Leem with the Think Tank Futuribles is broken down into four main sections:**

**Prospective** with an analysis of the 6 dynamics at work in terms of behavioural changes in French society:

1. The new direction taken in innovation towards ever increasing forecasting, precision and coordination between researchers, clinicians, pharmaceutical companies, etc.
2. The rise in home care
3. The emergence of the "Medicine as a Service", which combines therapy and therapy measurement to monitor its efficacy
4. The extension of care delivery to health pathways and even to life pathways
5. The transformation of health professions and of relationships between non-hospital care, hospitals and the nursing care sector
6. Greater recognition of ethical criteria when evaluating an innovation.

**"Drivers of innovation"** which shows the importance of new drivers such as artificial intelligence, immunotherapy, CRISPR-Cas9, along with the major benefit of associated drivers whereby artificial intelligence is combined with genomics, microfluidics and imaging, for example, to track cancer cells as far upstream as possible.

**Future of therapeutic advances** seen through the prism of 12 major diseases: cancer, cardiovascular diseases, autism, liver diseases, rare diseases...

**The 10 major tasks to be undertaken by Leem and stakeholders in the healthcare ecosystem.**

**The Health 2030 foresight analysis is available for downloading at [www.leem.org](http://www.leem.org)**

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