



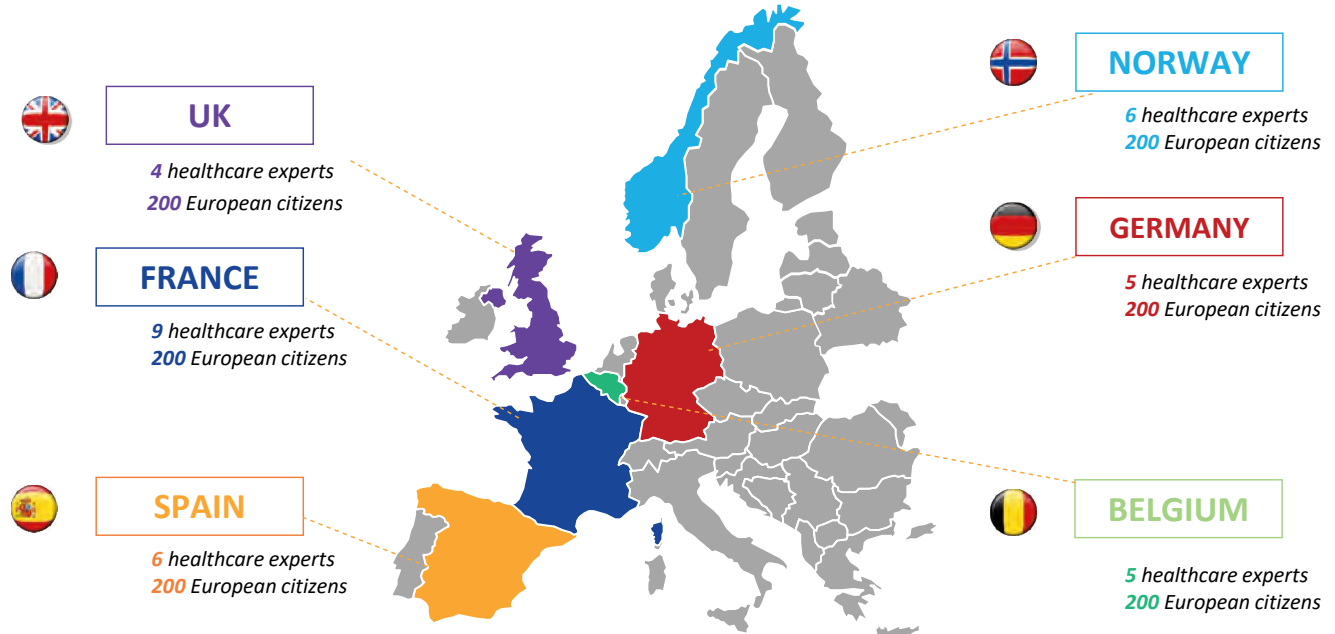
EUROPEAN STUDY ON THE DIGITALIZATION OF THE HEALTHCARE PATHWAYS

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Partnership with **GAME CHANGERS** 

sopra  **steria**
CONSULTING

COUNTRIES WHERE INTERVIEWS WERE CONDUCTED



Interviews lasting 1 / 1½ hours in person or over the phone in the language of the expert being interviewed

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#1 - DIGITISATION OF THE CARE PATHWAY: IT SHOULD BE HAPPENING HERE AND NOW

1 The technology is already available

- Increasingly advanced innovations and performances
- Technological innovations are raising ethical questions that need to be answered
- The technological revolution should not lead us to forget that, while many things can change, not everything will be possible either

2 Patients are ready to take the plunge

- Digitisation of the care pathway corresponds to a general increase in the importance of the patient
- A unanimous observation among experts: the large majority of patients are ready, or even waiting!
- Patients could start to engage in risky behaviours with their health data to be able to access digital tools and services

3 Players in the digital sector are very prominent and dynamic

- The GAFAM already have a considerable lead
- The drug, insurance and banking sectors are investing massively in digital health

#2 - STATUS OF DIGITISATION OF THE CARE PATHWAY ON A EUROPEAN LEVEL

1 The situation as perceived by experts in Europe: little visibility

- The status of healthcare system digitisation is viewed as similar in the various countries of the European Union and it is still in its early days

2 The experts' "European tour": the situation country by country

- Germany, digital transformation is lagging behind
- Belgium, the great leap forward of 2018
- Spain, a decentralised system with strong points still insufficiently digitised
- Estonia, all-digital applied to e-health
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- Finland, from decentralisation to complete centralisation
- Norway, a model of a digitised country
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3 And the European Union, the big missing piece?

- In the area of digitisation of healthcare systems and pathways, European Union bodies were only very rarely mentioned

#3 - THE CONDITIONS FOR SUCCESSFUL DIGITISATION OF THE PATIENT CARE PATHWAY

Preamble: the introduction of digital cannot be a “sprinkling”, it requires a total rethink of the care pathway

- A will on the part of national bodies to rethink the healthcare system using digital is viewed by almost everyone as a prerequisite

1 Digital must be the basis for the new care pathway: an opportunity to pass from act to pathway

- A major change is coming for doctors: they will no longer really be able to proceed through individual “acts of care” but rather through a “care pathway”.
- Home hospitalisation, an example that clearly shows the difficulties that must be confronted in switching to a care pathway rationale:

2 The interoperability of extremely diverse and compartmentalized information systems must be supported

- Interoperability is one of the key conditions for success
- Certain healthcare systems are lagging behind: the French and German examples
- Other health ecosystems are being developed: the example of Belgium

3 Data protection is the basis for the roll-out of the digital care pathway

- The GDPR is viewed as a big step forward in the digitisation of the care pathway
- In the experts' opinion, data protection is a prerequisite
- The risks of fraudulent use are likely to hamper patient approval

4 Reflection on the financing model is a must

- Financing models, a key area for reflection that has been left on the sidelines until now
- The current financing methods must be challenged: a revolution that must happen

5 The interoperability of extremely diverse and compartmentalised information systems must be supported

- Risks of gaps within the population of healthcare professionals: a need to adapt and train very quickly
- Digitisation is likely to worsen problems with accessing the healthcare system for certain populations of fragile patients: risk of a "double" gap

#4 - THE SWITCH URGENTLY NEEDS TO BE MADE AT THE RISK OF LOSING OUR DIGITAL SOVEREIGNTY

1 The giants of the web are said to currently concentrate unequalled power that States have minimal resources to counter

- Partnerships and the digital tools they are developing have given them a strong lead

2 Players that are increasingly hard to regulate: risk of a loss of sovereignty

- A loss of national sovereignty over data that is preventing the emergence of large-scale national players

3 The challenge for the internet giants: offer digital tools whose user-friendliness will win support from patients and healthcare professionals

- Digital tools will provide doctors and patients with use cases, in exchange for access to their data.

#5 - WHAT DO EUROPEAN CITIZENS WANT IN TERMS OF DIGITISATION OF THE CARE PATHWAY?

1 Evaluation of the quality of the care pathway on the national level: most people feel that there has been a deterioration

- Europeans generally feel that their healthcare system has worsened over the past 10 years: the Norwegians and Belgians are the least critical.

2 The large majority of people trust the ability of digital tools to improve the quality of the care pathway

- Almost 8 out of 10 Europeans think that the development of digital solutions will improve the quality of the healthcare system in their country
- The improvements expected are very extensive in all the countries in terms of prevention, but also as concerns the monitoring of chronic illnesses, the quality of diagnoses or the speed of treatment
- The hopes generated by the EMR are particularly high in countries where it is most developed (Belgium and Norway), but it is the tool that generates the most hope everywhere, in all countries

3

Europeans' evaluation of their country's status in terms of digitisation of the care pathway

- For a relative majority of the Europeans interviewed, their country is neither ahead nor behind
- No digital solution is currently viewed as sufficiently developed. The Germans are the least satisfied with the level of development of digital solutions in their country.
- A relatively large share of Norwegians and Belgians claim to already use their EMR in coordination with healthcare professionals
- In the other countries, the potential number of patients willing to put additional data in their EMR is quite substantial: Europeans are ready!
- A relatively consistent situation within all countries: the French, Belgians and Spaniards *would appear* to be even more inclined than the others to follow the recommendations based on an analysis of their health data
- In terms of managing their health, digital solutions and tools are still rarely used, except for connected objects and apps for monitoring wellness, which are used slightly more

4

The level of trust in the ability of the various players in the system to develop completely secure digital solutions

- Health professionals and establishments are the only players that the large majority of European citizens trust to offer them efficient digital solutions for improving their care pathway
- The same is true for ensuring the security of their health data (storage, confidentiality, anonymity),
- Paradoxically, whereas one quarter of Europeans claim to use connected objects, only a very small minority trust the GAFAM and innovative companies to alert them of the risks of illness

A close-up, shallow depth-of-field photograph of a doctor in a white lab coat with a stethoscope around their neck. The doctor's hands are visible, typing on a white laptop keyboard. The background is blurred, showing a bright, clinical setting. A red banner is overlaid on the left side of the image, and a white text box is overlaid in the center.

#1

**DIGITISATION OF CARE PATHWAYS:
IT SHOULD BE HERE AND NOW!**

1

THE TECHNOLOGY IS ALREADY AVAILABLE

Increasingly advanced innovations and performances

They all pointed out that the word “digitisation” encompasses exceptional innovations in very different areas: genomics, AI, digital mobility, data storage and sharing, applications, etc.

In these different areas, revolutions have already happened and others are currently underway that could radically change the patient care pathway as it exists today.

Technological innovations that raise ethical questions:

The experts emphasised the fact that they might give rise to serious consequences if we are not able to provide answers to the questions they raise.

- How to ensure that the confidentiality of the health data circulating and exchanged will be respected?
- How to assure the patient that he will continue to own his own medical data?
- How will people identified as having strong risks of developing illnesses be assured?
- Will digital create inequality between those knowing how to use it to ensure better healthcare for themselves and those who don't know?
- Will it be possible to evaluate the “health capital” of each person, will it become a source of injustice?

The technological revolution should not lead us to forget that not everything will be possible

Many experts warned against the boundless optimism of some who are convinced that the care pathway will totally change in the years to come.

2

PATIENTS ARE READY TO TAKE THE PLUNGE

The digitisation of the care pathway corresponds to a general rise in importance of the patient

For most of the European experts questioned, **the conjunction of a number of very rapid changes is increasing the importance of patients' role in their own health:**

- **The chronicisation of many conditions**, which is increasingly requiring the patient to be able to not only live with his illness over the long term, but also to learn the right behaviours to have in order to better control it.
- **The trend towards outpatient care and the development of home hospitalisation**, which now concern a very large number of medical conditions. These changes are requiring many patients to play a more active role in their medical treatment, but also require them to be better informed, assisted and monitored within their care pathway.
- **An increase in the “expert patient” phenomenon**. This expertise leads many patients to want to become “players in their own right” in their treatment, just like the health professionals monitoring them, even if their level of knowledge will never be equal.

2

PATIENTS ARE READY TO TAKE THE PLUNGE

A unanimous observation by the experts: the large majority of patients are ready, or even waiting!

- **The large majority of us have already experienced the digitisation of our administrative or fiscal pathway:** In the opinion of the experts, many of us already encounter digitisation as citizens (when replacing ID) or even as taxpayers (when paying taxes).
- **Support for the digitisation of the care pathway is currently a proven and measured phenomenon:**
 - **Certain experts point out that in many countries, whenever patients have the option of opening their EMR, they do so massively from the first weeks.** That has been the case in Belgium and France lately (4 million accounts created since November 2018). They analyse these phenomena as proof of their very strong interest in the digitisation of their care pathway.
 - **Other experts mentioned studies that allegedly show that, in most countries, individuals are not hostile to the digitisation of their care pathway,** in all its forms. They would support the development of telemedicine, teleconsultation, setting up Electronic Medical Records, genomics, the use of AI in diagnoses and surgery, etc.
 - **Less attention is being paid to data security and confidentiality:** habits adopted in other areas have caused patients to be less afraid, and they already leave a lot of their personal and sensitive data online (on Facebook, Amazon, etc.)

3

DIGITAL PLAYERS ARE VERY PROMINENT AND DYNAMIC

The GAFAM: a large number of initiatives targeting patients and health professionals...

For the experts, the exponential number of partnerships being set up between very different players, coming from apparently divergent sectors, is proof of how dynamic the digital health sector is.

- **Very innovative tools and applications:**

- **Targeting patients** and more specifically in the fields of prevention and use of Electronic Medical Records.



✓ *That's the case with Apple's Health Records whose users should be able to view, manage and share their medical records. The tool should also enable medication tracking, disease management, nutritional planning and assistance with medical research (supplying laboratories with anonymous health data).*

- **Targeting health professionals** and notably assistance with diagnosis and medical decision-making or for monitoring any changes in a patient's health.



✓ *That's the case with Amazon Comprehend Medical, a service that uses machine learning to analyse patients' medical records and whose goal will be to save doctors time in making decisions.*

3

DIGITAL PLAYERS ARE VERY PROMINENT AND DYNAMIC

The GAFAM : ... and phenomenal financial and human investments

Extremely large financial and human investments: the experts pointed out that billions of dollars are invested in research programmes with some very prominent universities, acquisitions and recruitments. The experts noted that no player, either public or private, has as many resources available.



✓ *Google has invested in around 60 Health Tech companies. Its two subsidiaries, Calico and Verily, are entities specialised in the health field and its digitisation. Verily groups together teams of doctors, biologists and engineers. To date it has received 800 million dollars in investments.*



✓ *In the USA, Amazon sells OTC medications (pain relief meds such as Advil, anti-allergy meds like Zyrtec, etc...) and medical equipment (blood pressure monitors, bandages...). For 1 million dollars, Amazon bought PillPack (a company specialised in the mail order and individualised preparation of medication for chronically ill patients, capable of covering almost the whole of the US).*



✓ *IBM is not a GAFAM but has invested more than 4 billion dollars in turning Watson Health into a centralised Cloud platform to collect, aggregate and analyse health data. Today, Watson Health employs 5000 people and its database is said to contain 300 million patients.*



3

DIGITAL PLAYERS ARE VERY PROMINENT AND DYNAMIC

Certain pharmaceutical laboratories are investing massively in the digitisation of the care pathway.

Many of them were late in switching to digitisation. For the experts, down the line there is a risk of confrontation between the pharmaceutical laboratories and the GAFAM, especially if digital tools were one day to be prescribed or even reimbursed like medication. For the pharmaceutical industry, the aim now is to:

- **Interact with the patient by creating tools for listening to him and advising him.** Drug companies have created platforms enabling patients to contact and interact with other people suffering from the same conditions (cancer, psoriasis, etc.)
- **Assist the patient with his treatment thanks to apps.** A large number of projects have been completed and especially apps that guide patients through the rehabilitation programme prescribed by their doctor and therapists.
- **Propose more effective treatments combining drugs and digital tools.** In 2016, Sanofi and Verily (Google) created Onduo, a company that aims to develop integrated solutions combining medical devices, software and treatments to facilitate patient care.



✓ *To ensure better compliance: the Otsuka laboratory developed a type of medication in pill form containing a sensor which, on contact with the gastric juices, produces an electronic signal captured by a receiver.*

3

DIGITAL PLAYERS ARE VERY PROMINENT AND DYNAMIC

Insurance companies are setting up many initiatives but they must confront “transparency” issues.

- **A model that is difficult to build.** For insurance companies, there are many setbacks.
 - **Legal**, with the issue of data confidentiality and how much each person trusts his insurance company.
 - **Psychological**, because it is hard to convince individuals that their insurance company has the legitimacy for this.
 - **Financial** lastly, since the apps rolled out are often under-used and not very cost-effective at present.
- **Initiatives in the teleconsultation field:** this would benefit insured people who, due to where they live (medical deserts) or their pace of life (little available time) have difficulty getting to see the doctor.
- **Initiatives in primary, secondary and tertiary prevention.** The experts think that these systems are effective, by mixing use of connected tools, medical advice, psychological support and interactions among patients.
- **However, certain players in the insurance field don't really try to hide the way they want to use digital:**



- ✓ Cooperation between insurance group John Hancock and Fitbit, with the group suggesting that its policyholders wear the connected bracelet to monitor their healthy lifestyle and varying the cost of premiums based on the efforts made



#2

STATUS OF DIGITISATION OF THE CARE PATHWAY ON A EUROPEAN LEVEL



1



The situation as perceived by experts in Europe: little visibility



The status of health system digitisation is viewed as similar in the different European countries, and it is still in its early days.



- 1. It would seem difficult at the moment to establish a precise hierarchy among European countries.**
 - **There is a lack of visibility of the situation of the various European countries**, but a commonly shared idea that most of them are at the same stage of development.
 - **Multiple evaluation criteria that are hard to rank.** What basis should be used? Level of use of the Electronic medical records? The existing level of interoperability? How dynamic public and private research is in the genomics field? Adaptation of regulations to the issues? The experts found it hard to evaluate how advanced their own country is in relation to the digitisation of the care pathway.
- 2. The Scandinavian countries are however more often viewed as being ahead of the game:**
 - **Estonia was sometimes mentioned as a “reference”.**
 - **More specifically, Finland or Norway were sometimes mentioned as countries ahead of the game.**
 - **Belgium was also mentioned by some people.**



The situation perceived by the experts in Europe: little visibility

  *As concerns the development of digital compared to other countries, I'm incapable of answering that question because everyone's moving at the moment and it's hard to know when we hear about projects in neighbouring countries what the actual reality of their deployment is"*

  *Compared to countries where the patient himself chooses his healthcare providers and which have a decentralised model, I don't think we have anything to be ashamed of and over the past seven or eight years, we've overtaken almost all the countries around us. At the same time, it's hard to self-evaluate, particularly compared to the Nordic countries, which have done a lot"*

  *Our system is one of the best in Europe in terms of efficacy compared to the other European countries. Our results are really good. Now if you look from the point of view of digital, our capacity for transformation is relatively slow and that could eventually put us behind the others. In fact, I know what we're doing and what we're not doing in digital but it's hard for me to say if we're ahead or behind"*

  *I would say that we're sort of in the middle of it. We've developed Digital enormously in Norway and we've started to set up an electronic patient record. But other countries have gone further in their thinking about standardisation and data exchange. And at the same time, there are also countries that are behind us. It's difficult to situate where we're at"*

  *I would put Germany in the middle. I wouldn't want to say behind. You also need to know which countries you're comparing Germany to? Austria of course has taken the lead with its electronic health cards. But some countries have taken interesting measures yet are failing to keep up and to integrate the new technological innovations, so it's hard to say"*

  *Hard to say. Clearly the UK isn't one of the best, we're far behind models like Estonia or Norway. But compared to the others? Compared to what exactly? In relation to the Electronic medical records, we're somewhat behind but in relation to the use of digital apps, I don't know"*

2

The experts' "European tour": the situation country by country (in alphabetical order)



Germany, delayed digital transformation.

- 1. The country's situation:** Germany is still in a difficult situation. First, because the federalism of the German state has given rise to heavy decentralisation. The German experts also think that the players in the German healthcare system are struggling to come to an agreement. The Gematik project, aimed at setting up a central telematics infrastructure, suffers from a lack of agreement between the stakeholders, along with resistance and slowness in decision-making.
- 2. Data confidentiality, a very sensitive subject:** the experts believe that data security is a major concern in Germany: this debate is also causing delays that are viewed as justified, given the potential risks to patients.
- 3. Changes underway:** the experts believe that the authorities are in the process of partially taking control. They also identified several major initiatives:
 - The electronic health card:** since October 2011, policyholders, health professionals, pharmacists, hospitals and health insurance companies have been interconnected by a smart card designed to ensure efficient and secure interoperability. It contains information such as social security or supplementary health insurance reimbursements and a medical history.



2

The experts' "European tour": the situation country by country (in alphabetical order)

- **Shared medical records:** in September 2018, the Berlin-based start-up Vivy officially announced its expansion across the whole of Germany and its many partnerships with health insurance funds and private insurance companies. The app enables a person to create their own digital health record to keep their health data in a secure manner.
- **The Big Data Project:** created by the German medical documentation and information institute, the information system on health care data went into service in February 2014 and aims to provide aggregated data on health care stemming from health insurance funds with the goal of developing research.
- **The strategy for digital in Nordrhein Westfalen:** The Federal Province of North Rhineland proposed a digital strategy with the goal of promoting digital health care in the province. The goal is to connect a telematics infrastructure with healthcare players (including 120,000 practitioners, 4,400 pharmacists, 350 hospitals...). Its goal is to improve interoperability between all players in the health system and to replace the paper-based medical documentation process by setting up electronic medical records.



2

The experts' "European tour": the situation country by country (in alphabetical order)



Belgium, the great leap forward of 2018.

- 1. The country's situation:** in the opinion of the experts, Belgium is one of the European countries that have initiated the digital transition of the care pathway. Patient data is already shared between the various establishments but also between many health professionals, enabling patients to enjoy better care.
- 2. In 2018, the country successfully met a major challenge by creating "MaSanté",** an online portal aimed at providing each citizen with a general view of his online health data. It offers:
 - A summarised health record
 - Access management: informed consent, therapeutic relations, exclusions
 - A summary of reimbursements made by supplementary health insurance companies
 - Screening of the population
 - Organ donor declarations
 - General Health and Science information
 - An eBox: electronic mailbox for official social security documents
 - Other functionalities are being investigated: history and schematic of medications & vaccinations and electronic prescription
- 3. Nevertheless, certain problems exist:** hence older health professionals are said to have more trouble mastering the digital tools, thus creating a generation gap and inequalities in treatment. Moreover, in terms of respecting patient confidentiality, many unresolved problems are still said to exist.

2

The experts' "European tour": the situation country by country (in alphabetical order)



Spain: a decentralised system with strong points but still insufficiently digitised.

The country's situation: The health system is characterised by heavy decentralisation in which each region enjoys extensive autonomy. This distribution enables the regions to develop innovative solutions quickly, but has also led to a divergent range of service offerings. The Spanish health system ranks 18th in the health system classification produced by the OECD and Spain ranks 5th in the world in terms of life expectancy (WHO ranking).

- **Strong points for the successful digitisation of the care pathway:** the country tends to be viewed as having some real assets for the successful digitisation of the care pathway. First, because it is already heavily engaged in decompartmentalising the healthcare offering and medical-social assistance. Next, because it has already taken some initiatives:
 - Spain has already rolled out Electronic medical records
 - A number of targeted initiatives: within the context of breast cancer prevention for example, women receive a message encouraging them to get screened.
- **But the goal now is to intensify the efforts to increase the share of digital in the patient care pathway:** this stake will be decisive in the development of the health system. Above all, the regionalisation of the healthcare system makes things more difficult.

2

The experts' "European tour": the situation country by country (in alphabetical order)

Estonia, the digital tour applied to e-health.

- 1. The country's situation:** this is a small country with 1.5 million inhabitants. Following the dematerialisation of exchanges in the banking and administrative fields, health went digital with the implementation of electronic medical records accessible online by doctors and patients some ten years ago. Estonia already offers a smart identity card that enables the user to access his medical records and especially:
 - Reports on exams and hospitalisation;
 - An electronic prescription service, which replaces the paper prescription and lists the patient's treatments and allergies (launched in 2010);
 - Administrative and social security reimbursement data;
 - Securing of data via blockchain. The patient also chooses who can access his records and in what circumstances;
 - Renewable prescriptions without the need to see a doctor. The latter handles them directly with the pharmacist.
- 2. In the opinion of the experts, interoperability could become internationalised:** since apparently there are plans to launch e-prescription with Finland in the very near future. Finns and Estonians would be able to buy their medication in the country neighbouring their own. However, some experts are wary of the media buzz and are not convinced that this interoperability is really for tomorrow.

2

The experts' "European tour": the situation country by country (in alphabetical order)



Finland, from decentralisation to complete centralisation.

- 1. The country's situation:** This country, with its 5.3 million inhabitants, is viewed by certain experts as the most decentralised in the world, with most healthcare managed on the level of each of the different health districts. Nowadays, almost all public hospitals and private health players use electronic medical records. Telemedicine has also been integrated into habits. The record contains:
 - The patient's social security administrative data
 - The results of analyses
 - The treatments being taken
 - Follow-up letters between a General Practitioner and a specialist
 - An area for the patient's own personal notes ("logbook")
 - X-rays with reports from the radiologist, along with an online appointment-making service.
- 2. ePrescription enables the doctor to set paper prescriptions aside and prescribe** medication by communicating electronically with pharmacies. The patient's treatment is archived and potentially accessible in the country's 600 pharmacies.
- 3. A new e-health service should, in the near future, enable the patient to be even more involved in his treatment:** eAccess will enable the patient to add his health data to his electronic records himself. After logging in using his electronic ID card, the patient will add data that he has measured himself (blood pressure, blood sugar level, pulse...).

2

The experts' "European tour": the situation country by country (in alphabetical order)

In France, digitisation is limited by the influence of mindsets and regulation: a situation that could change quite quickly.

- 1. The country's situation:** The experts agree in saying that France is situated within the European average, but that it is lagging compared to what it should be capable of proposing, and explain this by:
 - Very restrictive regulations
 - A lack of political will to make major decisions that apply to everyone, but the situation is changing.
 - Complex mindsets to be changed, the failure of the DMP (shared medical records) for almost 15 years (from 2004 to 2018) was a perfect illustration of this.
- 2. The *dossier médical partagé* (DMP):** launched in 2004 and applied generally on 6 November 2018, the DMP concerns everyone covered by social security, along with health professionals. It is secure and not mandatory. An estimated 2.3 million records had been opened by the end of 2017 and around 40 million will have been opened by the end of 2022. To date it includes:
 - All healthcare services covered by social security over the past two years
 - The possibility of completing a digital health record for anyone covered by social security
 - The possibility for health professionals to complete: previous medical history, conditions, medications, hospitalisation and consultation reports, exams, prevention using DMP-compatible software or through entering data on the Internet
- 3. The *Système National des Données de Santé* (SNDS):** There is nothing comparable to this database elsewhere in Europe with regard to the number of people concerned and the diversity of information collected.

2

The experts' "European tour": the situation country by country (in alphabetical order)

4. **Digital Healthcare Space:** In March 2019, the French National Assembly voted for the creation of a digital healthcare space. All patients will be able to open their own space by January 1st 2022. Free and customisable, this digital space will combine on the same platform all the information required for the patient's treatment and follow-up. The *dossier médical partagé* will serve as its cornerstone.
5. **The *Territoire de Soins Numériques/TSN (digital healthcare region) programme:*** The TSN programme was launched in 2014 and was allocated 80 million euros for the 2014-2017 period. The programme's goal was to modernise the healthcare system by experimenting with the most innovative e-health services and technologies in certain pilot areas and strengthening coordination between health professionals and innovative organisations in the field of patient care. 5 regions were selected for the experiment.
 - **The two main goals:**
 - Increase usage of digital services by health professionals and lead them to share common tools around regional support platforms
 - Formalise interactions between professionals -> aligned around standardised practices.

2

The experts' "European tour": the situation country by country (in alphabetical order)



Norway, a model of a digitised country.

- 1. The country's situation:** the experts believe that the health system in this country of 5 million inhabitants is one of the best in the world. The country is among those considered ahead of the game. Its very low density also explains the choice of greater digitisation of the patient care pathway. Many initiatives have been developed, including:
 - **The 1 citizen - 1 record initiative (Helsenorge.no):** This is a health portal intended for Norwegian residents. The platform was designed with the goal of connecting all the players in the care pathway (healthcare professionals, patients, hospitals, municipalities).
 - **The e-consultation:** The experts explained that the Norwegian government wishes to develop teleconsultation for patients wanting it.
 - **The Health Data Program:** this aims to improve the use of health data. It encourages research and innovation, strengthens patients' role in their care pathway and leads to a better assessment of patients' needs.
 - **Mixed Reality:** This digital project is still in the experimental phase, but could, according to the experts, enable the creation of better surgery scheduling tools (liver cancer). The idea is to create virtual 3D models of patients' organs to enable more precise treatment.

2

The experts' "European tour": the situation country by country (in alphabetical order)



The UK, digital transformation under pressure.

In the opinion of the experts, the British population is divided on the development of digital, notably due to questions pertaining to the use and management of the data provided. The experts explained that the population needs to be convinced of the benefits that digital can bring to the care pathway.

- **The GP2GP project:** this NHS Connecting for Health project enables British healthcare professionals to share patients' medical records. In the absence of personal medical records managed by patients, health professionals do have access to the information they need and testify to a certain level of interoperability that exists in the UK.
- **Personal medical record:** In 2016, the UK Health Minister made a commitment that all patients would be able to securely access their health records online by 2018. But the British health system is divided into several autonomous regional entities, which don't necessarily adopt the same practices. So this project remains complex to set up and was ultimately pushed back to late 2020.
- **Babylon project:** Babylon Health started out developing software that enabled an appointment to be made with a doctor using a 7/7 mobile app, and recently diversified its activities by developing a chatbot capable of providing health advice and producing a diagnosis for non-emergency health issues. Supported by the NHS, Babylon Health counts almost 800,000 users worldwide.

3

And the European Union, the big missing piece?



In the area of digitisation of healthcare systems and pathways, the various bodies within the European Union were only very rarely mentioned.

1. **As a player in a general strategy across the European region...**: the experts questioned think that major progress has always been made when the authorities displayed a strong political will to change the situation (in Belgium, Germany, France, etc.). The European Union is never viewed as really taking action on the subject except as concerns the setting up of the GDPR.
2. **...but also as concerns interoperability between EU countries**: the subject itself remains very “remote” for the large majority of experts given the efforts that still need to be made in terms of interoperability within the national regions themselves. However, when the subject did come up, notably as concerns partnerships between certain countries (Estonia and Finland for example), it was always mentioned as being steered and wanted by the authorities within the countries themselves, never by the European Union or with its assistance.



#3

THE CONDITIONS FOR SUCCESSFUL DIGITISATION OF THE PATIENT CARE PATHWAY

PREAMBLE: THE INTRODUCTION OF DIGITAL CANNOT BE A “SPRINKLING”, IT REQUIRES A TOTAL RETHINK OF THE CARE PATHWAY

A will on the part of national bodies to rethink the healthcare system using digital is viewed by almost everyone as a prerequisite.

For the large majority of experts, when certain countries are viewed as “somewhat” in advance, it is because there are politicians in those countries who want to change things. Without that political will, the digitisation of the care pathway from a theoretical viewpoint frequently leads to:

- **Dividing-up of initiatives:** digitisation of “bits of healthcare procedures”, limited to prevention or the treatment of certain chronic conditions (diabetes, hypertension...), for some patients, residing in a clearly defined area, with no general digitisation of the care pathway.
- **Fragmentation of players:** usually private, in extremely large numbers and highly diversified, and who communicate very little among themselves within a competitive environment.
- The rise to power of a large number of digital players in e-health, the very great diversity of the fields concerned (genomics, Artificial intelligence, big data, e-mobility, IT security, etc.) but also of organisations in the individual regions, makes the situation even more fragmented and anarchic.

1

DIGITAL MUST BE THE BASIS FOR THE NEW CARE PATHWAY: AN OPPORTUNITY TO MOVE FROM INDIVIDUAL ACT TO PATHWAY

Thanks to the generalisation of the Electronic medical records, a major change is on the horizon for doctors: stop thinking in terms of “act of care” and more in terms of “care pathway”.

Whenever health professionals have the means to use the Electronic medical records in a functional and useful way, then one should strive to reason as much as possible in terms of care pathway.

- **Treatment of the patient can take his entire medical history into account:** thanks to the Electronic medical records health professionals will have access to the person’s complete medical past (information on any illnesses he has been treated for, exams requested by other doctors, compliance with treatments, etc.).
- **Treatment of the patient will inevitably go well beyond the act of treatment itself:** the general practitioner and other health professionals concerned will have access to data on the efficacy of the monitoring measures set up and will be able to very precisely evaluate the improvement over time, along with any stabilisation or deterioration in his health, until his complete recovery.

1

DIGITAL MUST BE THE BASIS FOR THE NEW CARE PATHWAY: AN OPPORTUNITY TO MOVE FROM INDIVIDUAL ACT TO PATHWAY

Home hospitalisation, an example which, according to some experts, clearly shows the difficulties that must be confronted in switching to a care pathway rationale:

- 1. The difficulty with home hospitalisation, a pathway that involves a lot of healthcare providers and which requires monitoring many indicators:** this relates to the great diversity of essential indicators to be monitored and people involved in the home hospitalisation.
 - ✓ Continuity of care and observation of the patient should be possible almost in real time so as to be able to act very quickly if necessary (re-hospitalisation for example).
 - ✓ The data must be accessible to all healthcare staff who monitor the patient and there are often many of them (GP, hospital doctor, nurse, physiotherapist, nutritionist, etc.).
 - ✓ The data should enable many indicators of the patient's situation to be monitored: any clinical, psychological, family and social developments, etc..
- 2. For home hospitalisation, very specific monitoring functionalities need to be set up:** The goal is to ensure that the digital tools report on all data useful to the coordination of care, that they are easily accessible and above all understandable for all the health professionals concerned. Eventually, ideally, the Electronic medical records should also be able to integrate data from the IoT and apps that the patient is connected to.

2

THE INTEROPERABILITY OF EXTREMELY DIVERSE AND COMPARTMENTALIZED INFORMATION SYSTEMS MUST BE SUPPORTED

All the experts believe that interoperability is one of the essential conditions for success.

- 1. Health data is now available but is often much too compartmentalized.** The variety of information systems and software used by healthcare players represents an obstacle to sharing and efficient use of the existing data. **The level of interoperability is also an indicator of how far ahead a country is in the digitisation of the care pathway.**
- 2. The interoperability of healthcare systems: this is the initial prerequisite of any “digital care pathway”.** It is the condition for the continuity of information, for near-real-time updating of information, for access by all healthcare stakeholders wherever they are within a region. Without interoperability, making the transition from act of care to care pathway is not conceivable either.
- 3. A lack of interoperability of systems can have several causes according to the experts:**
 - The desire on the part of certain developers to offer health information systems that are not interoperable in order to block the competition.
 - In certain countries, the political will to ensure standardisation and homogenisation of systems is recent.

2

THE INTEROPERABILITY OF EXTREMELY DIVERSE AND COMPARTMENTALIZED INFORMATION SYSTEMS MUST BE SUPPORTED



Certain healthcare systems are lagging behind: the French and German examples.

- **In France:** the creation of the *Système National des Données de Santé* represented a key milestone in the establishment of a common language around health data. But in the opinion of the experts, France has the rarest “chest” of health data in Europe, but it had never been opened before 2016.
- **In Germany: the organisation of the German federal system and the very high level of regularisation of health systems is said to be blocking the definition of a** common terminology for the sharing and use of health data. Certain experts also pointed out the sometimes complicated culture of consensus and negotiation between players in the healthcare world.
 - ✓ *The example of the Gematik project, launched in 2005 for the introduction of an electronic health card and the development of new IT standards as bases for interoperability and an efficient exchange of data. It was not completed and was even abandoned by certain players due to a lack of agreement between the stakeholders, plus resistance and slowness in the decision-making process.*





2 THE INTEROPERABILITY OF EXTREMELY DIVERSE AND COMPARTMENTALIZED INFORMATION SYSTEMS MUST BE SUPPORTED


Other health ecosystems are developing very quickly thanks to interoperability: the example of Belgium.


- **A high level of interoperability already exists:** experts believe that the patient record is structured, prescriptions are dematerialised. 15 billion transactions were recorded in the Electronic medical records in 2017-2018. That figure should increase by 30% to 40% in the next few years. That would be the equivalent of 120 data exchanges per person and per year.
- **And which should take on more scope in the future:** for the Belgian experts, that interoperability will further progress in the next few years on two levels:
 - ✓  **More health professionals who will have access to medical data via the Electronic medical records:** this involves opening it up to other health professionals such as psychotherapists, dieticians, nurses or social workers.
 - ✓  **More medical data available:** this is the next step, it will involve opening the system up to data transmitted by the patient himself (an Internet of Things, a smart blood pressure monitor, etc.), which will be processed by algorithms and sent to the General Practitioners.
- **Eventually, certain Belgian experts think that it will be possible to integrate more “macro” information** (like the level of air pollution, temperatures and weather) and thus predict the number of potential hospitalisations within the day in a given region.

THE INTEROPERABILITY OF EXTREMELY DIVERSE AND COMPARTMENTALIZED INFORMATION SYSTEMS MUST BE SUPPORTED

 *Our big problem was that too many local initiatives had been launched at the same time. So then there are only two possible outcomes in the end: either you have 40 solutions that survive but which will never communicate with each other, or 39 solutions will die and only 1 will survive”*

 *With us, everything stays very compartmentalized, when you consider that the public health sector doesn't talk to the medical-social sector, that the large majority of tools aren't interoperable and that the large majority of software providers make sure they aren't compatible with the neighbour!”*

 *One of the biggest problems that we're encountering at the moment in relations between the health sector and industrial companies is that they offer many solutions, but for specific cases. They aren't systemic solutions or solutions that reach enough people. They are independent of each other.”*

 *Interoperability is the basis. If that doesn't exist, if each person is developing his own system in his corner without the ability to exchange information between all the various healthcare players, it isn't even worth talking about digitisation of the care pathway”*

3

DATA PROTECTION IS THE BASIS FOR THE ROLL-OUT OF THE DIGITAL CARE PATHWAY

The GDPR is viewed as a big step forward in the digitisation of the care pathway.

- **Because it defines a legal framework** for the use of data in the digital care pathway
- **Because it creates a common standard** for all European countries
- **Because it enables the general public and patients to have more visibility** over the way their health data is used and protected
- **Because it gives the patient control over his EMR**, as is the case in Belgium, for example, by enabling him to choose which health professionals have access to his records.

From the experts' viewpoint, data protection is a prerequisite, however:

- **A whole section of patient data is only partially covered by the existing regulations:** this is the case notably for “massive” data in OpenData, OpenAccess, which will eventually need to be subject to the same regulation.
- **Certain experts pointed out the lack of any feedback on the level of compliance with regulations** by the players collecting that data: insurance companies, supplementary insurance companies, healthcare professionals, public bodies.

3

DATA PROTECTION IS THE BASIS FOR THE ROLL-OUT OF THE DIGITAL CARE PATHWAY

The risks of fraudulent use of data are likely to hamper patient approval.

- **Risk of data hacking:** an increasing number of medical devices are connected to a hospital information network via various types of link (4G, Wi-Fi, Bluetooth or hardwired). But the danger is also said to exist outside the hospital.



- ✓ *In 2018, the American College of Cardiology (ACC) apparently put out a warning about the risks of connected implantable defibrillators being hacked, recommending the installation of protection software, along with informing doctors and patients. Other experts mentioned real risks of data being hacked. In 2018, hackers stole the medical records of 1.5 million inhabitants of Singapore – more than a quarter of the population – including those of the prime minister.*



- **“Inappropriate” data transfer:**

- ✓ *In 2017, DeepMind, an artificial intelligence company belonging to Google, was sent the data of 1.6 million patients from NHS hospitals in London, within the framework of a partnership designed to help hospital staff detect cases of acute kidney failure more quickly. But this agreement was judged as “inappropriate” by the government organisation entrusted with monitoring health data. The question was to determine whether, within this specific framework, patients should have given their approval or not for the transfer of this data.*



DATA PROTECTION IS THE BASIS FOR THE ROLL-OUT OF THE DIGITAL CARE PATHWAY



In the cardiology field, there's the connected stimulator. It's wonderful to have your own connected stimulator and to know that if surgery is needed, the hospital can call you and tell you to take it easy. But there is still a major lack of standards. The connected cardiac stimulator has existed for many years. But what is its certification in relation to the data collected? Who can access this data? We don't know. Belgium is one of the rare countries where medical data is shared between all the institutions. But the protection of privacy is still a fairly strong obligation."



Of course, our fellow citizens have been leaving their data on Facebook, Amazon or Google for a long time without it posing any problem. But bear in mind that what we're trying to create is very ambitious and we need patients to trust us for it to work. But scandals like Facebook/Cambridge Analytica and Google/NHS and so on keep happening. Little by little a real distrust is being created which could grow and expand."



The other key point of vigilance is the circulation of data and respect for privacy which probably presents difficulties. In 2016 there was an attempt to make public data secure through the Touraine Law, which is very good but otherwise, most data are collected by private operators and are resold by the same private operators, without respecting any of the rules. That doesn't seem to scare our fellow citizens! I think that everyone knows it, but digital makes life so much easier that we forget"



Of course, data protection is extremely important here. Data protection instructions cannot be compromised. As you know, the Germans are very sensitive to data protection, even though they publish all sorts of things on Facebook. So if a scandal was revealed, that's the kind of thing that will make patients decide that they don't want people having access to their data. It's fundamental."

4

REFLECTION ON THE FINANCING MODEL IS INDISPENSABLE

Financing models, a key area for reflection currently left on the sidelines.

- **Financing of the development of digital tools for digital healthcare: there are few solutions.** The setting-up of Public-Private partnerships seems to be one solution, but only a very few structures are likely to develop them. This situation gives the advantage to the GAFAM.
- **However some examples do exist of Public-Private partnerships that have been set up.** The experts mentioned some of them but underlined at the same time that they tend to be rare.
 - ✓ In France, the Lab Santé Ile-de-France assists innovative project sponsors in the healthcare field. Its service offering is centred on linking public and private players.
 - ✓ In Norway, the municipality of Stavanger, the city hospital and three industrial companies have formed a partnership aimed at deploying robots designed for the rehabilitation of elderly patients at home. The robots are equipped with sensors and video systems, and the goal is to reduce the number of hospitalisations.
 - ✓ In the UK, the creation of Health Innovation Manchester aims to improve the health of 2.8 million inhabitants of the Greater Manchester area. It involves setting up a system with a very high level of interoperability between all the players, bringing in industrial companies, drug companies, university centres and researchers etc. to work on the project.

4

REFLECTION ON THE FINANCING MODEL IS INDISPENSABLE

- **The current means of financing give too much priority to setting up local initiatives...:** the difficulties encountered in setting up Private Public Partnerships prevent the development of large-scale initiatives. So they usually remain limited to the local and regional levels, although there are some exceptions.



- ✓ In the UK, Babylon Health has developed a chatbot capable of giving health advice and establishing a diagnosis for non-emergency health issues. Supported by the NHS, Babylon Health counts almost 800,000 users worldwide. The NHS pays Babylon Health approximately €80 per year and per British patient to use Babylon Health.

- **...or in specific business sectors such as insurance or certain professions:** there are a number of targeted initiatives in professional sectors. These are very effective, but the tools they provide remain limited to the sector and to the professional risks run by the profession in question.



- ✓ Efforts to prevent dental cavities in bakers set up by AG2R La Mondiale and the French professional bakers federation: between the age of 18 and 25, bakers-pastry-makers and candymakers have five times more dental crowns than the other independent professions due to the presence of flour and sugar suspended in the air at their workplace. Sensors were installed at the bakeries that agreed to take part in an experiment: these took measurements of particles suspended in the air and put out an alert if there was a risk and indicated if workers needed to brush their teeth. This initiative opened the way to prevention and screening campaigns throughout the profession and reduced the cost of damage by 3.

4

REFLECTION ON THE FINANCING MODEL IS INDISPENSABLE

Current financing methods must be challenged in order to come up with new solutions: a revolution that must happen.

Certain options were put on the table by the experts:

- **Financing based on the level of measured efficacy of digital tools:** some think that one possible model would be to take the model used for evaluating drugs as a partial basis. The reimbursement rate for digital tools could be determined by its level of efficacy. This model is already being developed, but not in all countries.



✓ In Spain, Diabetes Menù is the first app available on prescription for diabetic patients. On the initiative of the Abbott laboratory, a smartphone app was prescribed to almost 3000 diabetic patients to enable them to manage their condition on a day-to-day basis (information on the amount of sugar in the food ingested by scanning the product label, possibility of recording their blood sugar readings, determining a weekly diet, or sharing all their information with a health professional). That app was scientifically validated by a community of experts then certified by the Spanish health authorities.

5

THE VERY REAL RISKS OF “GAPS” MUST BE RESISTED

Risks of gaps within the population of healthcare professionals: the need to adapt and train very quickly.

1. **Gaps occur during the roll-out of the Electronic medical records:** with the arrival of the Electronic medical records, older health professionals (the age of 55 was sometimes mentioned) then find themselves dealing with tools that they struggle to understand, but that are revolutionising the very core of their mission. The following should be taken into account:
 - ✓ **Doctors’ lack of training on the Electronic medical records:** often taken into account too late according to the experts. This is even more concerning for the fact that a number of doctors probably delegate this task to their assistant who is only very rarely trained.
 - ✓ **The exclusion of other healthcare professionals:** especially those who act more specifically in the field of prevention, but also monitoring of treatment (nurses, physiotherapists, etc.) and for whom no training has been provided for for the time being in terms of access and use of the Electronic medical records.

5

THE VERY REAL RISKS OF “GAPS” MUST BE RESISTED

Digitisation is likely to worsen problems with access to the healthcare system for certain populations of fragile patients: risk of a “double” gap.

2. **A number of experts are alarmed about the risks being run by many patients:** whereas the purpose of the digitisation of healthcare systems is to ensure better coverage of all patients.
 - **Populations that are more fragile than the others:** these are elderly and handicapped people (but also the poorest individuals and those with the lowest levels of education) who find it much harder to navigate the care pathway. Whereas the use of connected objects initially requires a real effort on the part of the patient. That is not an option for everyone.
 - **Populations that are more isolated than the others:** these are people living in a rural or peri-urban environment who may be facing a double gap (distance and Internet) preventing them from accessing their digitised care pathway.
 - ✓ France’s example is particularly interesting: 15% of the population are said to suffer from “computer illiteracy”, i.e. difficulty in using / inability to use the Internet efficiently. Furthermore, within the framework of the *Plan France Très Haut Débit* (Very High Speed France Plan), 100% of the country was supposed to be covered by a very high speed internet connection, 80% of it via fibre optics, within the next 5 years. Currently, less than half of the French population (49.7%) are eligible for this offer. According to some estimates, at this rate of roll-out, the goal set for 2022 will be reached in 2035.





#4

THE SWITCH URGENTLY NEEDS TO BE MADE AT THE RISK OF LOSING OUR DIGITAL SOVEREIGNTY!

1 The giants of the web currently concentrate unequalled power that States have few resources to counter

The partnerships and digital tools that they are developing have given them a big lead.

1. **A concentration of power never seen before.** The GAFAM and some other giants of the web have much greater (financial and human) resources than those of the States in the large majority of research fields involved in the digitisation of the care pathway. Moreover they have a real lead when it comes to the development of a number of tools. The experts provided several examples:



- ✓ In January 2018, Apple announced the arrival of Health Records, which allows users to view, manage and share their medical records. From June of the same year, the company announced that 4 new features had been added to its app: medication tracking, disease management, nutritional planning and medical research (sending health data to labs). The proposed changes are moving very fast.



2. **Partnerships with an increasing number of players from the care pathway.** These giants of the web are “short-circuiting” the authorities to work with clinics, hospitals and universities in the various countries. They are forming partnerships, without the authorities being able to do much about it.



- ✓ In May 2015, IBM signed a partnership agreement with 14 US clinics specialised in cancer, for the use of Watson. In 2018, Google listed more than 75 partner organisations among the healthcare establishments in North America. The agreement between Google DeepMind and the three London hospitals, which led to the transfer of the data of 1.6 million patients, also shows the strength of the GAFAM’s ability to set up partnerships with the players that currently possess the data.



2

Players that are increasingly hard to regulate: the risk of losing sovereignty

A loss of national sovereignty over data that is preventing the emergence of large-scale national players.

1. Activities will be increasingly hard for States to regulate. For the experts, there is a genuine risk of a loss of digital sovereignty for States that may find themselves less and less able to regulate the activities of the GAFAM in their country..



- ✓ There are countless examples: the Facebook/Cambridge Analytica scandal and the personal data of 87 million users sent to be used in targeted electoral campaigns or the “inappropriate” transfer of 1.6 million records from the UK’s NHS to Google. As early as 2013, the CNIL also called certain French hospitals to order, instructing them to stop giving access to anonymised medical records to private doctors’ offices.

2. This loss of sovereignty handicaps the “national” giants. Some experts think that nowadays, economically speaking, this lack of control over the GAFAM is also preventing the emergence of “national” industrial companies, capable of rivalling them. Some countries like China have set up legislation that has made their national market more difficult for the GAFAM to access. India is preparing similar legislation.



- ✓ In 2016, China adopted legislation forcing foreign companies to store data from Chinese web users within China. This led Apple to build its first data centre in China, and it entrusted the management of its users’ data to a local partner.

3

The challenge for the Internet giants: offer digital tools whose user-friendliness will win support from patients and healthcare professionals

Digital tools that will provide doctors and patients with use cases, simply and easily, in exchange for access to their data.

1. **Provide patients with use cases, based on data from their EMR: the key to success.** For the experts, this is the next major stake. If digital players manage to offer “turnkey” digital tools, enabling patients to exploit their health data, it is likely that many of them will entrust all their data from their digital apps, their Internet of Things and also their Electronic medical records to those players.



Hence, IBM's Watson Health is said to already have a database of 300 million patients.

- If we want patients to be able to be players in their own health thanks to digitisation, all their data must provide them with pertinent and personalised advice, and give access to smart indicators that can decode the data without submerging them in data they are unable to decipher.



- ✓ Google is developing a Google health coach. “Project Wooden” consists in offering a virtual assistant that can advise its users (dietetic meals for diabetics, in particular). It is said to be based on AI, which, using the user's own health data, could personalise his coaching.

3

The challenge for the Internet giants: offer digital tools whose user-friendliness will win support from patients and healthcare professionals

- 2. Provide digital tools that enable health professionals to use the data from the Electronic medical records simply and quickly.** Once again, experts believe that those players who manage to provide doctors with digital tools will “hit the jackpot”. The challenge will lie in setting up interfaces allowing doctors to be provided with the patient’s key information, analysing the data according to profile and previous health problems, without submerging him in data he doesn’t need. He will need assistance in prioritising.

THE SWITCH URGENTLY NEEDS TO BE MADE AT THE RISK OF LOSING OUR DIGITAL SOVEREIGNTY!



The GOOGLE / NHS agreement failed. The Information Commissioner stated that the agreement didn't comply with the "Data Protection Law" and published a simple reminder of the law: procedures allowing patients to know who has their data and how to ask for it to be removed are vague, or even non-existent."



IBM, GOOGLE, AMAZON and APPLE are everywhere. In the USA, they offer high-quality digital apps, work on shared medical records and on large quantities of data with the most famous universities. We have to be very careful about what happens."



The GAFAM are working with an increasing number of hospitals in the USA and Europe, with some very big universities. We've let it happen and the resources they have make them all-powerful. The next challenge, and it might be the last, is when they manage to recover patients' health data and secure doctors' loyalty by offering them tools that are so good and so compatible with their needs that they will no longer really have any problem doing it."



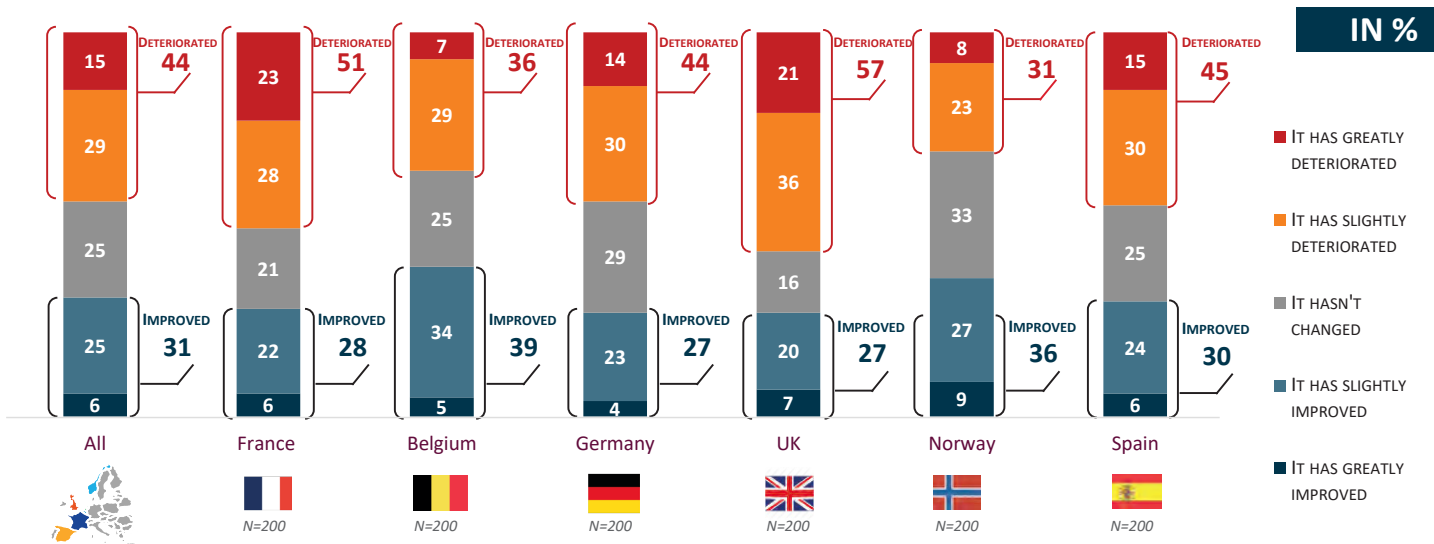
When someone wants to put down 10 or 20 million or 50 million, we're really happy about that on the level of the French state, the problem is that the GAFA put down 1 billion, 2 billion, 10 billion! We're not on the same scale. They do what they want with the data that they collect and don't report to anyone. What's more, no one asks them to."

#5 1

EVALUATION OF THE QUALITY OF THE CARE PATHWAY ON THE NATIONAL LEVEL



Generally speaking, Europeans usually feel that their healthcare system has worsened over the past 10 years: the Norwegians and Belgians are the least critical of the evolution of their health system. The British and French are more critical.



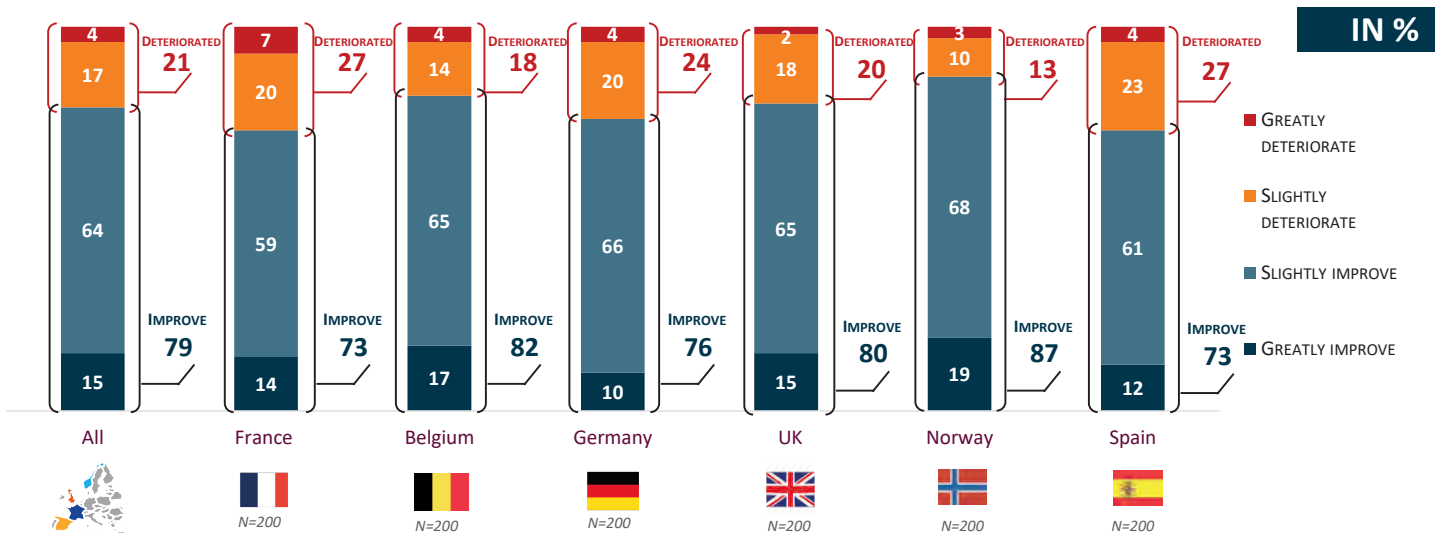
Q. : When you think of the health system in your country, would you say that it has improved, deteriorated or has not changed in the past 10 years?



#5.2

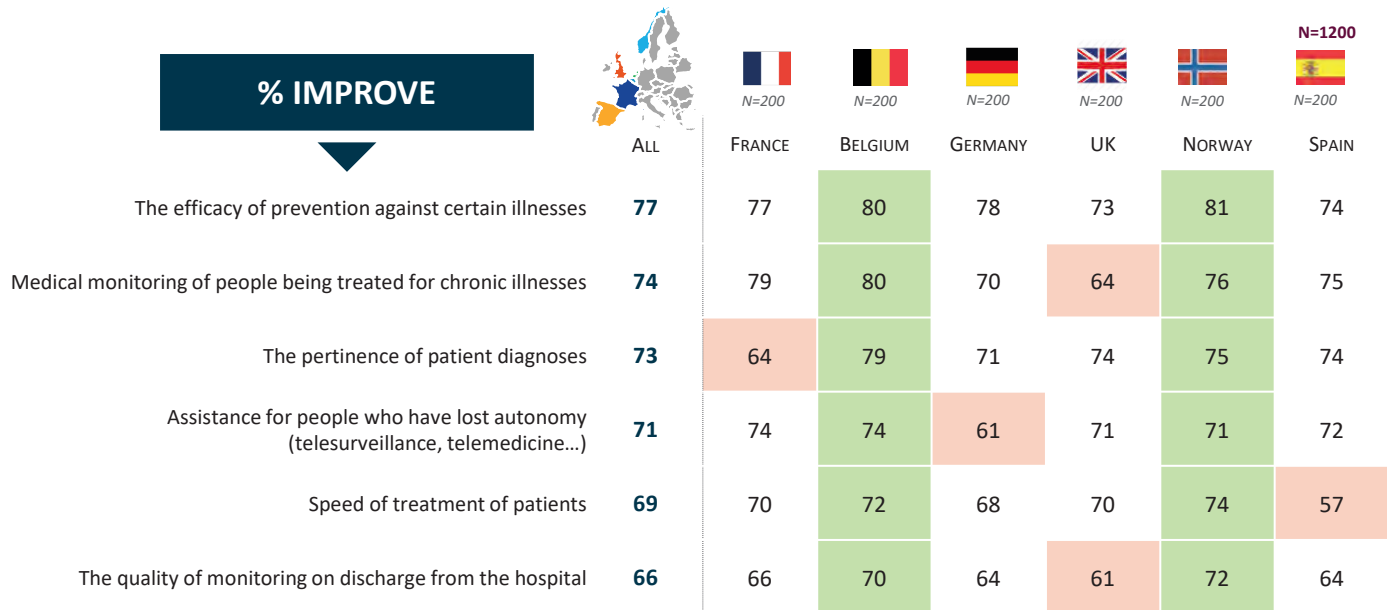
LEVEL OF TRUST IN THE ABILITY OF DIGITAL TOOLS TO IMPROVE THE QUALITY OF CARE PATHWAYS

Almost 8 out of 10 Europeans think that the development of digital solutions will improve the quality of their country's healthcare system: a hope found among the large majority of people in all countries, a little stronger in Norway and Belgium, a little less so in France and Spain.



Q. : Do you think that the development of digital solutions in the health field (apps and connected objects, patient's electronic medical records, artificial intelligence, robots...) will improve or deteriorate the quality of your country's health system:

The improvements expected are extensive in all countries in terms of prevention, but also in terms of the monitoring of chronic illnesses, the quality of diagnoses or the speed of treatment.



Q. : And in detail, do you think that the development of digital solutions will improve or deteriorate each of the following elements of the care pathway in your country:

The hopes generated by the Electronic medical records are particularly high, where it is most developed (Belgium and Norway) but this is the tool that generates the most hope in all countries (except the UK).

| | | | FRANCE | | BELGIUM | | GERMANY | | UK | | NORWAY | | SPAIN | |
|---|-------|------|--------|-------|---------|-------|---------|-------|-------|-------|--------|-------|-------|----|
| | YES % | No % | N=200 | N=200 | N=200 | N=200 | N=200 | N=200 | N=200 | N=200 | N=200 | N=200 | N=200 | |
| The patient's electronic medical records | 76 | 16 | 78 | 16 | 81 | 10 | 68 | 22 | 74 | 19 | 81 | 11 | 77 | 14 |
| Digital exchange of health data between health professionals but also between patients and health professionals | 76 | 16 | 75 | 17 | 75 | 17 | 75 | 17 | 78 | 17 | 81 | 12 | 71 | 17 |
| Monitoring apps for an illness requiring long-term treatment (diabetes, hypertension...) | 74 | 17 | 74 | 18 | 67 | 22 | 81 | 12 | 75 | 18 | 72 | 19 | 73 | 16 |
| Connected objects (connected watch...) and apps for monitoring lifestyle, diet, physical activity, sleep...) and consequences on their health | 57 | 32 | 55 | 34 | 56 | 29 | 59 | 31 | 53 | 39 | 61 | 29 | 58 | 27 |
| Introduction of artificial intelligence in a number of areas: diagnosis, prevention, orientation, prescription, care... | 53 | 33 | 48 | 37 | 50 | 32 | 48 | 40 | 54 | 33 | 55 | 33 | 64 | 24 |
| Consultation with the doctor through a computer, tablet, smartphone... (telemedicine) | 47 | 42 | 42 | 48 | 37 | 51 | 53 | 38 | 52 | 38 | 52 | 37 | 45 | 43 |
| Blockchain | 20 | 23 | 24 | 20 | 18 | 21 | 21 | 26 | 21 | 27 | 16 | 19 | 21 | 24 |

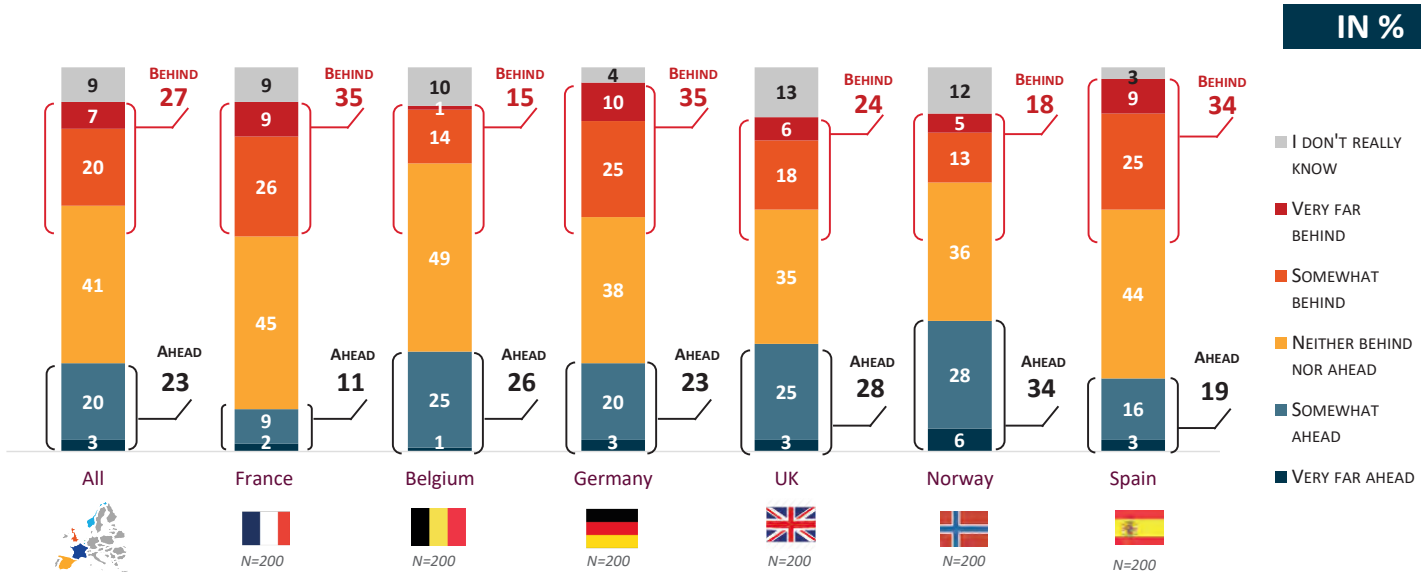
Q. : For each of the following digital innovations, please say whether you think that it will enable the care pathway to be improved in your country?



#5.3

EVALUATION OF THE COUNTRY'S STATUS IN THE DIGITISATION OF THE CARE PATHWAY

For a relative majority of the Europeans questioned, their country is neither ahead nor behind when it comes to the use of digital solutions. No country views itself as clearly ahead or behind. More than one third of Norwegians believe that they are somewhat ahead.



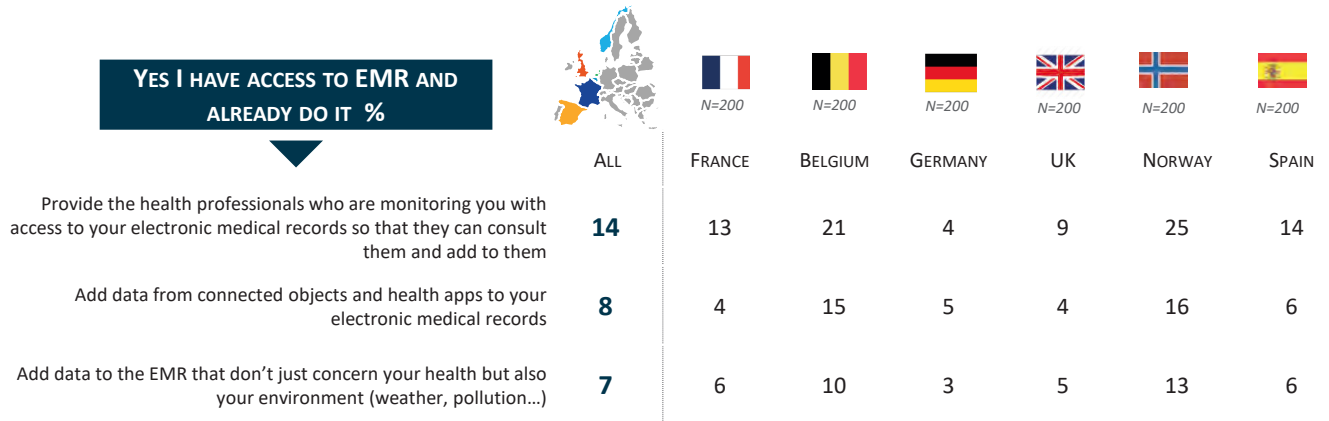
Q. : On the whole, compared to what you know or what you see, how would you evaluate your country when it comes to the use of digital solutions for improving the patient care pathway?

No digital solution is currently viewed as sufficiently developed. The Germans are less satisfied with the level of development of digital solutions in their country.

| | SATISFACTORY % | | UNSATISFACTORY % | | FRANCE N=200 | | BELGIUM N=200 | | GERMANY N=200 | | UK N=200 | | NORWAY N=200 | | SPAIN N=200 | |
|---|----------------|----|------------------|----|-----------------|----|------------------|----|------------------|----|-------------|----|-----------------|----|----------------|--|
| | 47 | 36 | 48 | 39 | 58 | 25 | 27 | 52 | 45 | 36 | 53 | 31 | 49 | 35 | | |
| The patient's electronic medical records | 47 | 36 | 48 | 39 | 58 | 25 | 27 | 52 | 45 | 36 | 53 | 31 | 49 | 35 | | |
| Digital exchange of health data between health professionals but also between patients and health professionals | 40 | 43 | 39 | 44 | 46 | 36 | 26 | 58 | 45 | 36 | 42 | 38 | 42 | 43 | | |
| Monitoring apps for an illness requiring long-term treatment (diabetes, hypertension...) | 34 | 41 | 33 | 41 | 34 | 37 | 31 | 52 | 38 | 39 | 29 | 38 | 41 | 40 | | |
| Connected objects (connected watch...) and apps for monitoring lifestyle, diet, physical activity, sleep...) and consequences on their health | 33 | 42 | 29 | 50 | 36 | 34 | 27 | 53 | 39 | 37 | 31 | 33 | 35 | 46 | | |
| Introduction of artificial intelligence in a number of areas: diagnosis, prevention, orientation, prescription, care... | 29 | 44 | 31 | 42 | 29 | 41 | 20 | 56 | 31 | 41 | 32 | 33 | 32 | 47 | | |
| Consultation with the doctor through a computer, tablet, smartphone... (telemedicine) | 28 | 49 | 26 | 51 | 24 | 50 | 21 | 60 | 37 | 40 | 36 | 37 | 24 | 55 | | |
| Blockchain | 14 | 25 | 16 | 23 | 13 | 28 | 13 | 31 | 15 | 22 | 14 | 14 | 13 | 31 | | |

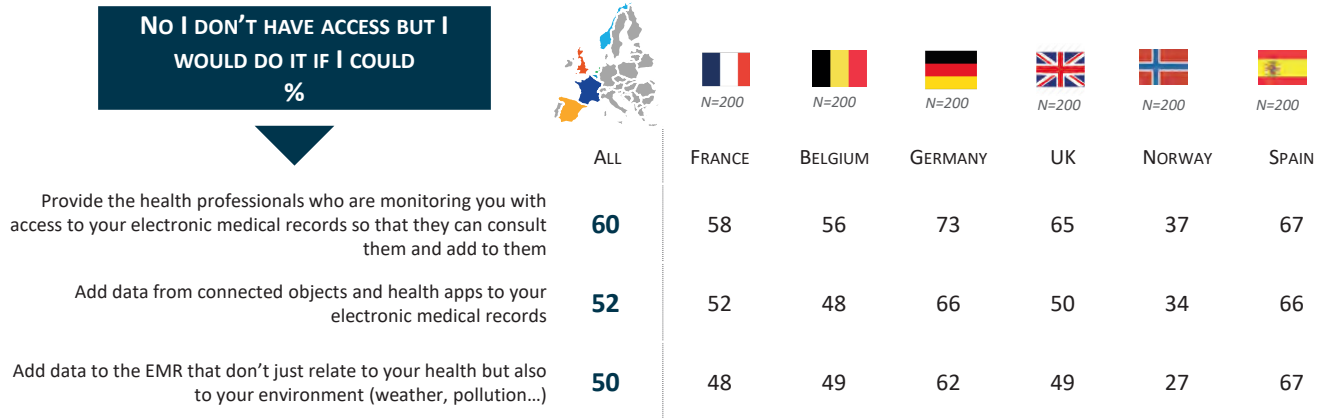
Q. : Would you say that in your country, the level of development of the following digital solutions as part of the care pathway is satisfactory or not?

A relatively large share of Norwegians claim to already use their Electronic medical records in coordination with any health professionals they may consult.



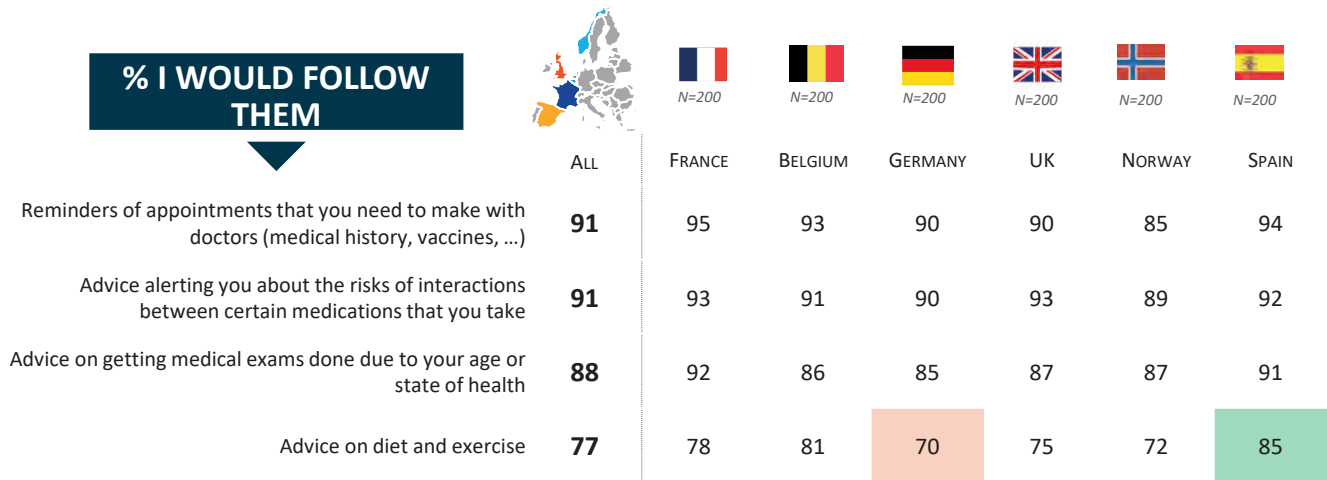
Q. : Concerning the patient's electronic medical records that you already have access to or might have access to in the near future, do you or would you do the following things

In the other countries, the potential number of patients willing to add more data to their Electronic medical records is substantial: Europeans are ready!



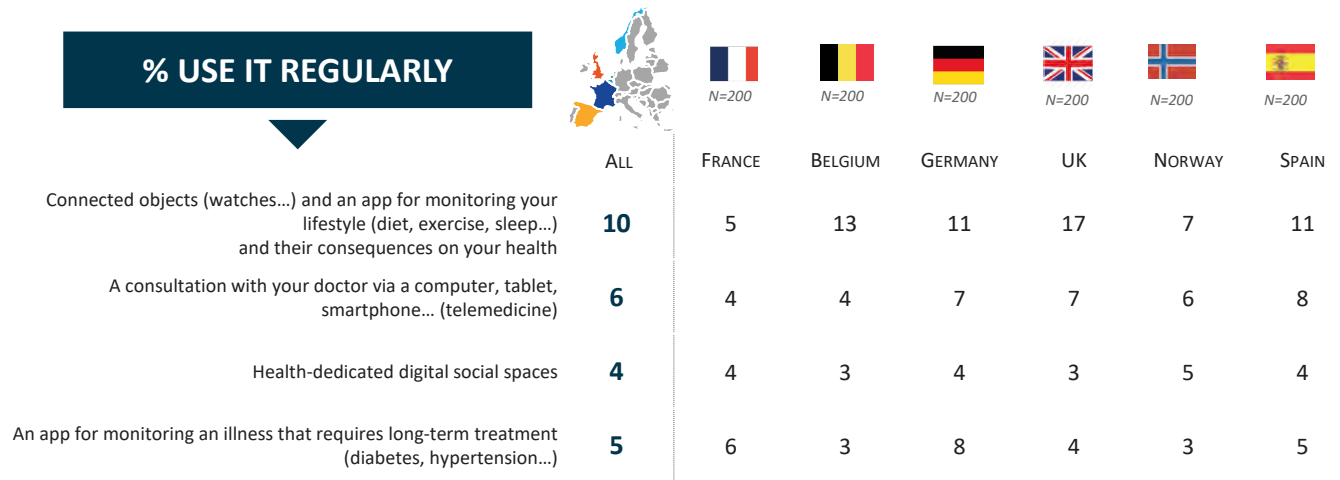
Q. : Concerning the patient's electronic medical records that you already have access to or might have access to in the near future, do you or would you do the following things

A relatively consistent situation within all countries: the French, Belgians and Spaniards seem to be even more inclined than the others to follow the recommendations based on an analysis of their health data.



Q. : If tomorrow, thanks to the analysis of all your health data, you were to receive the following personalised recommendations, what would you do:

When it comes to managing their health, digital solutions and tools are still rarely used, except for connected objects and apps for monitoring wellness, which are used slightly more: levels of use of the various digital tools and solutions are very similar in all countries.



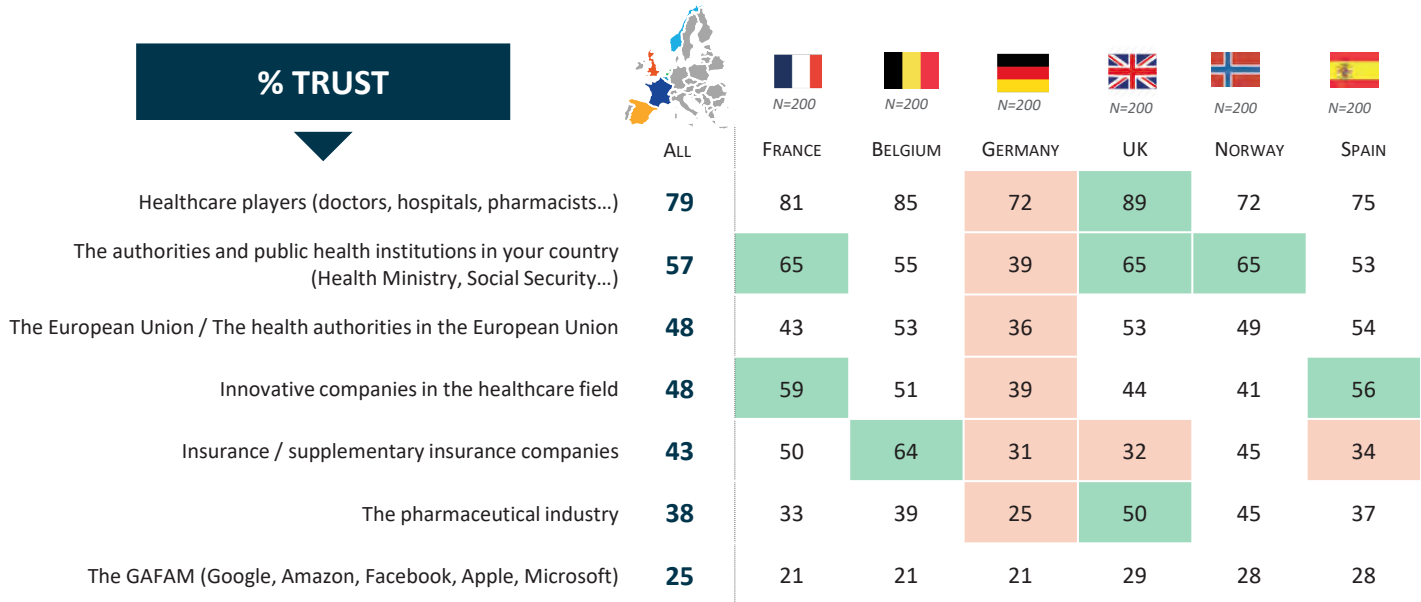
Q. : Today, in managing your health, do you use the following digital tools and solutions:

A photograph of three healthcare professionals in white lab coats. A man in the center is holding a tablet, looking down at it. A woman on the left is looking at the tablet, and a woman on the right is looking at a laptop. They are in a bright, clinical setting.

#5.4

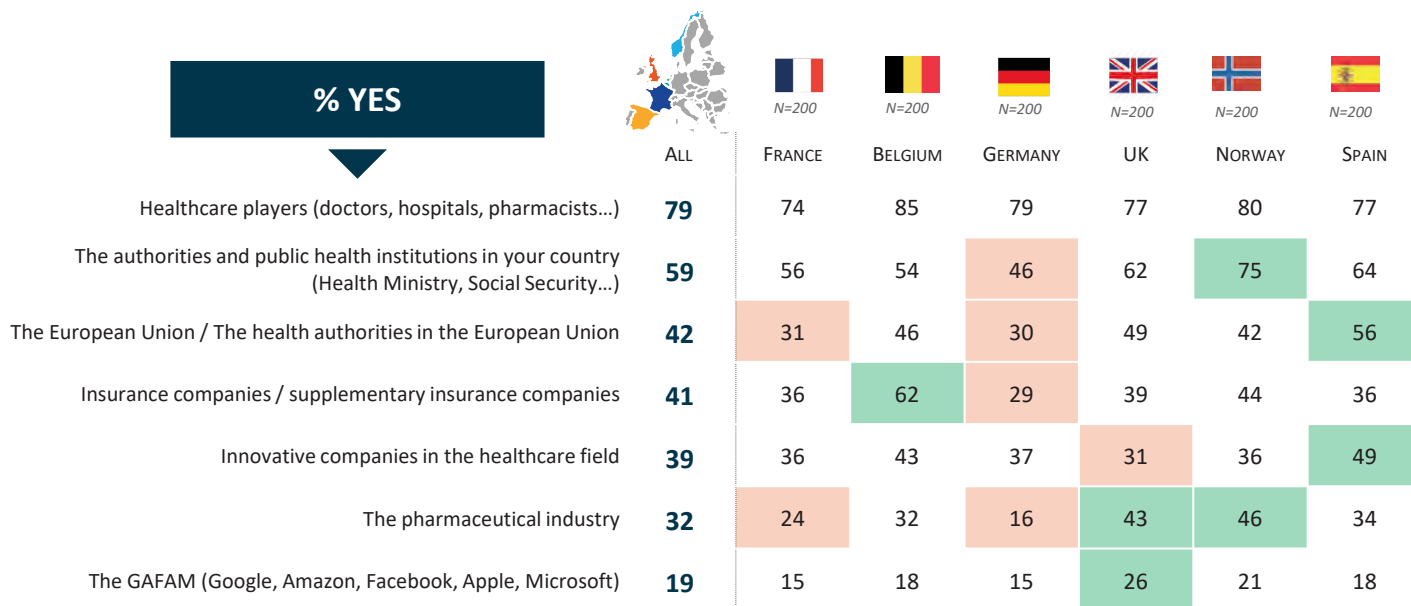
LEVEL OF TRUST IN THE ABILITY OF THE VARIOUS PLAYERS
IN THE SYSTEM TO DEVELOP COMPLETELY SECURE DIGITAL
SOLUTIONS

Healthcare professionals and establishments are the only players that the large majority of Europeans trust to offer them efficient digital tools for improving their care pathway: the Germans show themselves to be generally more distrustful.



Q. : For each of the following players, would you say that you trust them or not today to contribute to setting up effective digital solutions that will improve the care pathway in your country?

As concerns the security of their health data (storage, confidentiality, anonymity), only health professionals and establishments enjoy the trust of the large majority of people: the Germans distrust most players in the system.










Q. : For each of the following players, would you be willing or not to entrust them with your health data in total security (secure storage, confidentiality, anonymity)?

Paradoxically, whereas almost one quarter of Europeans claim to use connected objects, only a very small minority trust the GAFAM and innovative companies to alert them of risks of illness.

TO ALERT YOU OF ANY RISKS OF ILLNESS OR HEALTH PROBLEMS THAT YOU MIGHT ENCOUNTER

IN %

| |  | N=200 | N=200 | N=200 | N=200 | N=200 | N=200 |
|---|---|---|---|---|---|---|---|
| | | FRANCE | BELGIUM | GERMANY | UK | NORWAY | SPAIN |
| | |  |  |  |  |  |  |
| Healthcare players (doctors, hospitals, pharmacists...) | 71 | 79 | 72 | 68 | 72 | 66 | 70 |
| The authorities and public healthcare institutions in your country (Health Ministry, Social Security...) | 27 | 35 | 21 | 15 | 25 | 40 | 26 |
| Innovative companies in the healthcare field (apps like Doctolib, connected objects, artificial intelligence, health data exchange system, teleconsultation...) | 13 | 13 | 15 | 15 | 7 | 11 | 14 |
| The European Union / Health authorities in the European Union | 13 | 10 | 14 | 8 | 11 | 10 | 24 |
| Insurance / Supplementary insurance companies | 10 | 12 | 20 | 11 | 4 | 2 | 14 |
| The pharmaceutical industry | 8 | 6 | 8 | 4 | 11 | 8 | 11 |
| The GAFAM (Google, Amazon, Facebook, Apple, Microsoft) | 4 | 1 | 4 | 5 | 5 | 2 | 9 |

Q. : And which players would you trust most to offer you the following services based on the health data you entrust to them?



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