Hospital of the Future

Alcatel·Lucent
Enterprise

Hospital of the Future? There's not a week that goes by without an article, a conference, a radio or TV program that doesn't mention the tremendous technological advances that highlight a bright future for eHealth. Are we going to see nurses browsing services on a hoverboard, like a Marty McFly boosted by a stream of automated information? No "Back to the Future" proposed here, but rather a projection, with Alcatel-Lucent Enterprise, of a real perceptible evolution in the next 5 to 10 years for patients and health professionals.

Follow the guide...

"There is no need to wait for a building boom to integrate emerging technologies into hospital operations. Numerous digital solutions could be implemented now or in the near future to improve operational efficiencies and clinical outcomes. Hospitals could implement remote patient monitoring, telehealth, advanced analytics, and wearables to more fully engage with patients for improved quality and outcomes."

The Smart Hospital

Innovations will change the hospital experience. As in most sectors, the hospital of tomorrow is already starting a "connected" revolution. Omnipresent connected objects, robots, floors, walls, furniture and "smart" accessories.

The intelligence mentioned here reveals the current transition, objects and materials that will not be limited to collecting information and then producing unusable data. The intelligence lies in the collection, analysis and support of stakeholders, such as patients, in decision-making and the anticipation of risk-based situations.

This "intelligence" will go further with the ability to learn from the unknown situations that will become points of reference.

All these developments must meet several imperatives:
- Security
- Quality
- Performance

- Economic efficiency
- Simplicity of deployment and use

National governance is emerging on these topics in most countries. The future will require the implementation of reference standards and certifications (technical, ergonomic, safety) that will allow this new technological ecosystem to improve deployment while meeting the needs of users.

In a general way, the "smart hospital" will bring:
- To the patient, an increased offer of network services and an ease of use for them and their family
- Tools, for clinical staff and professionals to enable them to deliver quality and efficient care while also making their job easier
- Medical equipment and applications, that will be available where needed and when required

The keyword: CONNECTIVITY

- Simplify, secure and optimize, inter-professional exchanges
- Optimize information flows and business models to refocus professionals on their core business
- Transmit information to patients and enable them to become agents in their own care
- Implement an effective mesh between patients, professionals, equipment and resources

94% of respondents believe that digital solutions contribute to improving the care pathway in hospitals

SOURCE: Infographie sur l'hôpital du futur, Octobre 2018

Patient experience

Patient experience

We all are, or will be one day, considered a patient. This label is often synonymous with a course that sometimes turns out to be the obstacle course. We have observed an evolution of medicine: Preventive, Predictive, Participatory, Personalized and last but not least relevant medicine. The hospital of the future operates a coherent alignment of this journey by placing the patient at the center.

Patient-centered approach

The patient-centered approach is based on the relationships between a patient, his or her family and healthcare professionals. These partnerships lead to a care plan, its implementation and its adjustment over time*.

The patient agent

The patient of tomorrow becomes their own care pathway agent, informed about their pathology, empowered in their medical care and in collaboration with their care team. How? Via data collected through new connected objects, stored and analyzed (Big Data) before being shared. The patient will be informed and will participate in their own healthcare decisions while communicating on their habits, tastes and preferences.

Data security

The collection, storage, analysis and sharing of information are carried out in the strictest confidence, respecting regulations to ensure the security and integrity of personal data.

* Definition by the French Health Authority

97% of patients surveyed were satisfied with their first telehealth experience

SOURCE: 5 User Experience Trends Driving Healthcare Digital Transformation, Forbes, Daniel Newman, April 2018

A complete patient journey

Pre-hospitalization

Web or mobile applications of personalized medicine for prevention and early diagnosis, telemedicine, making appointments online, perioperatively. Thus, the first links in the patient journey management are set up with all stakeholders (care organizations, insurance companies, etc.)

Hospitalization

• Optimized reception and admission without waiting
• Self-guided navigation services for access and orientation within the hospital
• Emergence of patient-focused robots offering reception and accompanying services
• Ultra-connected rooms with infotainment systems and hotel-type services
• Certified and secure connected objects (vital signs, geo-location, smart beds, and more)

Post-hospitalization

Development of post-operative follow-up and treatment monitoring applications, telemedicine, and communication with the healthcare team via collaborative platforms.

What does the future need?

In five to ten years, the following services will be essential:

• A patient medical file that is available on a national hub, centralizing the medical and medication plan for each patient, regardless of the provider, prescriber, pharmacist, specialist, nurse, patient or care staff. Medical care providers will be able to consult or add information for accurate follow-up of the patient.

• A national patient agenda: Put the patient at the center of coordinated health care. Improve participant coordination and follow-up efficiency through a complete visual of their appointments and events associated with the patient's journey.

In the long term, the patient's commitment to the hospital will remain based on the human relationship, assisted by a "digital twin" allowing the solid implementation of personalized medicine.

Technology for
health professionals

Technology for health professionals

The growing hospital trend is to pool and share resources and data (interconnect). This trend is expanding to include medical offices, nursing homes, health professionals, and more. The hospital of the future is a hub within this network.

Moving from justification to prevention

For the tasks performed, too often, current tools available to healthcare professionals are used as a justification process. With the convergence of technology and associated practices, a radical change is coming to practices. Medical care will be more preventive care because of telemedicine and associated diagnosis tools. These tools help support decisions based on diagnosis made through the reprocessing of risk information.

Refocus caregivers on their core business

The organization of the patient journey in a consistent manner, combined with visibility and cross-communication with the stakeholders concerned, will eliminate the loss of time related to miscommunication due to inappropriate tools. Thus, each healthcare professional will focus on his or her core job, rather than wasting time on administrative tasks.

Optimize flows

Outpatient surgery will become more widespread as home-based recovery and monitoring will be more practical. Enhanced care plans will help relieve emergencies, optimize care flow and the patient's journey.

62% of health professionals consider digital technology to improve patient's living conditions in hospitals

SOURCE: Infographie sur le patient et la santé numérique, Octobre 2018

Learn how Medcare improves their caregivers experience

Medcare - United Arab Emirates

With more than 1500 users, Medcare's main challenge was to give doctors and caregivers instant access to medical information by bringing the six sites together. Through complete, safe and effective connectivity, ALE has supported and developed the mobility between these sites, while providing a high-end service for patients.

"The Alcatel-Lucent Enterprise solution helps us to deliver a 5-star patient care and healthcare experience. By facilitating access to information for doctors and medical personnel, it supports staff productivity and helps our team make the right decisions every time."

NAUSHAD MOHAMMED, GENERAL MANAGER, IT, MEDCARE

View the customer video >

Technology and human welfare: Striving for positive changes

The combination of human welfare and technology allows the development of these new services:

- Robotic and Artificial Intelligence
- Connected objects
  - Beds, smart band-aids, vital signs sensors, connected devices
  - Tools for assistance in caregiving (secure delivery of medications, medication side-effects, better observance of treatments, cross analysis)
  - Bracelets, badges, connected equipment for geolocation identification, traceability in real-time
- Patient and professional portals, including communication and multimedia collaboration services
- Optimization of connected equipment, IoT and infrastructure
- Big data and associated analysis

In this new context, health professionals who are used to working in isolation, will increase collaboration using more efficient tools around patients and joint projects.

At the heart of these developments is the full connectivity applied to organizations (mobility, geolocation, network infrastructure, optimized workflows), inter-professional/patient collaboration and the ability to integrate connectivity into business applications.

What does the future hold?

In the years to come, the following tools and solutions will be more readily available:

- The shared medical file will not only be a data warehouse, it will offer analyzed and cross-referenced information to support decisions.
- Access to patient data and applications, supporting large volumes of data, will be mobile, in real time and ultra-secure.
- Dedicated portals integrating collaborative services, will allow the linking of a group of people, the collection and the simplified exchange of information (within and outside the hospital).
- Connected devices designed and certified to produce data that makes sense. Platforms to store and exchange this data in a secure way and provide access to professionals.
- Artificial intelligence with collaborative tools to analyze and process the large volume of data.
- Telemedicine will enable a doctor to use the generated data and, if necessary, use artificial intelligence for complex diagnoses. Remote monitoring of patients will minimize movement, perioperative monitoring applications will be developed.
- Customized patient monitoring will be assisted by robots, connected systems, tools of assistance for care giving. These tools will give professionals more time for the human relationship with the patient, by providing them with relevant information about the patient's condition.
- Better organization and workflows will enable significant reductions of administrative constraints and improve vigilance and execution of automated tasks.
- Geolocation and navigation services will make it easy to find the necessary medical equipment and personnel.
- Social networks dedicated to health professionals will enable more efficient communication, better cohesion, better scientific performance (advice, help with diagnosis, feedback, and more).

The future begins today for delivering the best care, ensuring the best use of treatments while maintaining the human and ethical aspect of the exchanges between care staff, patients and relatives.

Smart and connected hospitals

Smart and connected hospitals

Technology brings together structures, health professionals and patients. Specifically, a computer network connects people and machines creating an organizational mesh in which the hospital is a hub. And, good care will reach beyond hospital facilities and be present everywhere.

At the administration level, the management of the assets (usage-maintenance) and people (geo-referencing, geolocation, security, data sharing, accompaniment of patients and visitors) are at the heart of all concerns.

In the next five years, Alcatel-Lucent Enterprise (ALE) aims to enable hospitals to optimize patient and caregiver services and provide a unique infrastructure for geolocation. This effective monitoring of equipment and people will contribute to safety while improving the flow of patients and visitors.

The patient's room of the future

Modern, friendly and ultra-connected, patient rooms contribute to the autonomy of the care staff, while facilitating the services they provide.

For simple services, the patient no longer needs to have the care staff help them. Through an application on a tablet or smartphone, they could, for example, control their bed position, change the temperature of their room, close the curtains, order meals and more. Their touch screen will control all comfort related applications and provide the benefit of hotel-type services.

Applications already exist to automate services for admissions and discharge from a hospital. Now those capabilities and services are also accessible through smartphones and tablet applications. This is supported by a network infrastructure that is always available, offering reliable and effective solutions for real-time connectivity for patients, care givers and other relevant parties.

This intelligent "connectivity" becomes the indispensable and common link in your organization.

Calls to the healthcare team made by the patient will be better qualified, so the team can prioritize its interventions (call for a glass of water, call for assistance for pain, dizziness, distress, etc.)

Communicating objects will transform the way patients interact with hospital staff:

- Real-time feedback of information
- Doctors can remotely monitor patients
- Increase the frequency of information exchanges between patients and the heatlhcare team
- Better resources and staff management with the right resources available when and where needed and required.

"Hospitals can provide more personalized care, better engage with consumers, and elevate the patient experience by using digital solutions to aid omni-channel patient access, including customer apps, patient portals, personalized digital information kits, and self-check-in kiosks."

SOURCE: Deloitte – 2018 Global Health Care Outlook

See East Sussex Healthcare NHS Trust's digital transformation

East Sussex Healthcare NHS Trust - United Kingdom

The "NHS Trust" is one of the UK's largest, with more than 6000 employees. The institution needed an infrastructure that could support future technology transitions and allow professionals to use mobile devices. The new network provides redundancy, reliability and support for efficient and cost-effective service delivery.

"There's a new generation of doctors coming through, they are all very IT literate, they're using iPads and tablets and they want to use this in hospitals to be able to deliver patient care next to the patient. At NHS Trust we realized we had to invest in IT (...) so we've replaced the network (...). The more time the system's up, the more time clinicians have got with patients."

ANDY BISSENDEN, ASSOCIATE DIRECTOR OF DIGITAL, EAST SUSSEX HEALTHCARE NHS TRUST

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Geolocation

Geolocation infrastructure is designed for tracking people and assets:

- **Simplifies the patient's journey** with self-guided navigation tools and interactive kiosks that when located in the outpatient or waiting room section, promotes dissemination of information and patient self-registration to reduce or eliminate wait times.
- **Secures people and assets** with an intelligent alarm processing solution, able to connect events generated by a person, a sensor or a connected object that staff, with the appropriate skills and nearest to the alarm, can respond to.
- **Improves maintenance services** by monitoring the medical and non-medical resources used to better organize them:
  - Reduce downtime of facilities or critical equipment
  - Synchronize patient treatment schedules
  - Improve inventory management

Innovation: People and resources in the right place at the right time

New geolocation services and solutions for people and assets are being set up. A badge provided to staff and patients helps locate them and to prevent them from entering protected areas or getting lost. A tag installed on equipment can be traced, generating a notification to the geolocation service if the equipment goes past a pre-defined zone, where the equipment should not be moved to.

Crisis communication

In emergency scenarios, such as "plan blanc"* or code blue, where real-time communication and collaboration are key, the hospital will be able to synchronize all elements of its organization to provide an optimal response with:

- Mobilization of teams
- Internal and external communication
- Management of beds and rooms
- Internal patient transportation
- Location of medical equipment
- Setup of impromptu/temporary triage areas (indoor or outdoor)

Hospitals supported by technological innovations are future focused and place high importance on the well-being of both users and healthcare professionals. Tomorrow's progressive hospital is being built today.

Connectivity is spearheading this transition, moving from concept to realization and generalization.

* French plan blanc: The French white plan (plan blanc) is the emergency plan for facing a sudden increase in hospital activity, such as a massive number of casualties to treat due to an accident, disaster, epidemic or a lasting climatic event that becomes deadly for fragile people such as a heatwave.

Use case:
Camille's care path and the associated professionals

01
Contact of the patient's doctor

Patient

Camille has not felt well for several days. She contacts her doctor through a dedicated application.

A chatbot (virtual assistant) directs her to detail her symptoms. A calendar offers the availability of her doctor for consultation.

Health professional

Appointment alert

Symptom information and intelligent asset management analysis.

02
While waiting for the consultation with the patient's doctor

Patient

Camille's connected bracelet feeds her personal medical file in line with her vital signs.

After confirmation of the RDV by the medical office, information about the symptoms, conduct and follow up are transmitted to Camille.

Health professional

Visibility of the appointment and symptoms.

If necessary, access to cross-referenced information:
• From her vital signs
• From her medical history
• Past and ongoing treatments

03
Consultation with the patient's doctor

Patient

In Camille's shared medical record, the appointment with her doctor is validated as completed.

Camille will benefit from an electronic summary of the consultation, the exams to be carried out and an alert reminding her of the upcoming appointments.

Health professional

The doctor benefits from an automated analysis of the data contained in Camille's personal and shared medical file. He visualizes the medical history and allergies, the examinations she has already done with other colleagues and the possible links between her medical history and her current treatments.

He drafts and validates his request for biological examinations and imaging to complete his diagnosis. He offers Camille different appointment slots depending on the availability of specialists available in her sector. In a few clicks, they validate together the appointments.

04
Pending the completion of exams

Patient

Camille validates the transmission of her administrative and medical information to authorized stakeholders.

Health professional

Camille's doctor has automatic alerts to track each step of his patient's journey.

05

Execution, analysis and transmission of the exams

Patient

Reception of results and feeding of the personal and shared medical file. Artificial intelligence cross references information and advises hospitalization. Camille is informed via an intelligent therapeutic education which details the stages of her patient journey.

Health professional

After receiving the results of examinations and alerting from the artificial intelligence, the specialist recommends hospitalization, he validates his diagnosis with the patient's doctor and transmits to the hospital team concerned.

06

While waiting the pre-admission to the hospital

Patient

Camille receives the address for the hospital and the localization of the services which will take care of her. She can also visualize the interior of the hospital and route to be taken once on the premises. She confirms the updating of the administrative information allowing her smooth pre-admission (healthcare support, medical insurance, etc.) equals simplified admission and without waiting.

Health professional

The hospital and Camille's doctor receive automatically all the elements constituting the medical history of Camille, results of examinations and diagnoses from the specialists.

07

Pre-hospitalization

Patient

Camille indicates in an app her wishes for hospitalization and comfort (single room, internet access and TV, entertainment, room temperature, accompanying person, meal preference, etc.). The availability and confirmation of registration of the wishes of Camille are done.

As part of the anticipation of a surgical procedure, Camille confirms the information relating to her informed consent.

At any time, Camille can consult the list of medical team members that carry out her follow-up and will be able to ask questions if necessary.

Health professional

As part of the anticipation of a surgical intervention, the health care team communicates to Camille a questionnaire and information to confirm her consent, anticipate risks and validate the elements related to her operation.

The reception of the elements sent by the patient validates the organizational and regulatory process.

The hospital's internal teams automatically anticipate the necessary resource and material reservations.

09
Hospitalization

Patient

Camille sets her comfort options directly from her bed:
- Inclination of her bed
- Rooms roller shutters
- Temperature
- Choice of videos on demand
- Availability of magazines
- Etc.

She changes her meal options, within the limits of what is allowed by the medical team.

Camille transmits via her tablet her relatives' visits requiring the reservation of meals. She makes video calls with her family.

On her touch pad, Camille remains regularly informed by the hospital of:
- Activities organized in relation to her therapeutic plan
- Promotional offers
- Local and national news
- Etc.

Health professional

The service's doctor advocates a return to home in two days with follow-up by an external specialist and intervention of several care professionals.

Through her shared medical file the appointments are made and confirmed.

08
Admission to the hospital

Patient

Upon arrival, a reception robot confirms with her one last time the elements relating to her stay, then validates her actual arrival.

Health professional

Management is carried out, all internal and external agents at the hospital are kept informed of Camille's care path.

10
Post-hospitalization

Patient

After the medical team's validation for a return home, Camille automatically informs her relatives via her touch screen.

She confirms the transport and associated options. Camille benefits from a hospital service for home delivered meals, in relation to her tastes and preferences.

She changes her meal options, within the limits of what is allowed by the medical team.

Camille is alerted for the observance of her treatments and the adaptation of dosages in relation to her condition.

Health professional

The service doctor advocates a quick return home with follow-up by an external specialist and intervention of several care professionals. Through her shared medical file the appointments are made and confirmed.

Before leaving, the hospital confirms with her the support by adapted transport.

The carrier confirms the support and receives the information necessary to transport Camille under the conditions imposed by her pathology.

11
At home

Patient

During her entire convalescence at home, she selects the meal menus that are delivered to her. She allows herself some sweets, within the limits of what is authorized by the medical team.

Her file is fed by the information collected by connected objects and food information associated with meals that are delivered to her (caloric intake and nutrition).

Camille has automatic alerts to track each step of her patient journey.

As part of her follow-up, she confirms the teleconsultation dates with her doctor.

Camille receives the doctor's report and therapeutic advice.Via a digital assistant on her tablet, Camille is informed by the hospital that offers contacts and appointments with patient associations to improve her pathology and convalescence.

The digital assistant regularly transmits information and advice to adapt her food choices, and exercises related to her pathology.

Health professional

Appointment and details of the intervention of a home-based nurse are also confirmed and validated.

Her care takes place over several weeks. All stakeholders have automatic alerts to keep track of each step of Camille's patient journey.

As part of her therapeutic follow-up, two teleconsultations are planned. The doctor validates two dates for proposition to Camille.

After validation, he's alerted at the moment of his choice to recall the history of Camille's journey.

After teleconsultation, the doctor types his report via intelligent voice recognition. The information exchanged and the teleconsultation recording can be attached to the patient's file.

Camille's therapeutic plan is a success, however a teleconsultation of control in six months is validated.

The Alcatel-Lucent Enterprise strategy

Alcatel-Lucent Enterprise (ALE) is positioned as a key connectivity player for ongoing and future developments, delivering reliable, secure and high-quality services and solutions for:

- Optimized care pathway
- Improved patient reception, whether at the central level or within care units
- Reduced workload of teams by optimizing processes
- Improved patient experience by offering technologies that make them feel at home
- Facilitate the everyday life of professionals with real-time collaboration and communication systems
- Improve staff responsiveness through targeted notifications
- Protect assets and people
- Engage in successful digital transformation by choosing the right technology that connects people and machines

Connecting for a collaborative approach

Alcatel-Lucent Enterprise's mission is to help healthcare providers optimize the care pathway. Optimized is a mighty big word that is overused in theory. ALE proposes an implementation plan to improve the care pathway by connecting all relevant agents and the patient in a collaborative approach for:

- A better hospital experience
- Effective and efficient care
- Permanence of care
- Access to patient data
- Collaboration with staff and the facility for optimized territory operations

One of the keys to the adoption and generalization of these technological developments is connectivity, integrated into business processes. Infrastructures must also enable the management of connected objects (IoT), of which the "explosion" within hospitals is to come. The goal is to decompartmentalize completely the exchange of different data. Once the entities are connected, you can easily connect the service-creating components with the patient, the care staff, or a data collector.

Follow and anticipate evolutions

ALE offers the latest technology developments:

- Increasingly collaborative management that is faster and simpler
- Safely connect objects to the hospital network infrastructure
- Simple solutions ready to deploy and use

In the future, there will be no healthcare without connectivity.

ALE believes that for exceptional healthcare, the future requires:

- **A network and communication infrastructure that offers:**
  - Real-time ultra performance
  - Security from the edge to the core
  - Wired and wireless connectivity
  - Robust and scalable
- **The Alcatel-Lucent Rainbow™ solution**, which is an enterprise cloud solution that provides unified communications services to connect people and systems.

Rainbow™ Healthcare

The Rainbow solution

The Rainbow cloud communication offer, certified HDS (European regulation on the hosting of health data), covers all the communication and collaboration functions in an innovative way and are controlled by you and your clients:

• Accompany the hospital in its digital transformation through open fixed/mobile communication functions.

• Secure investments made on the existing communication system by integrating into infrastructure already in place.

• Integrate into business applications: Rainbow Hub provides all the elements (in client or API form) to integrate its services into business, web and mobile applications.

A complete network throughout your territory

Rainbow manages entities and their connections: A patient and a caregiver, a machine, a piece of equipment, a robot (chatbot) or an IoT. ALE phone sets also integrate the Bluetooth Low Energy (BLE) function to enrich the "mesh" and improve the accuracy of geolocation.

Rainbow will allow the hospital to manage who is in contact with, or has access to, such data, taking into account the organization of the hospital and its interactions with the outside world and the process course stage. Rainbow HUB enables engagement and partnership with startups to provide integrated connectivity services in business applications. For example, the company Clepsydra has quickly integrated Rainbow APIs in its application (Sovinty) of perioperative monitoring.

Examples of Rainbow interfaces for innovative patient services

Technology is the foundation for the digital transformation of healthcare

The network infrastructure (LAN and WLAN, WAN and data center) is the foundation of secure connectivity, scalable and tailored to the needs of the hospital. We envision the following services and technology for the coming years:

- **Increased bandwidth:** Access network connectivity will evolve from 2.5 GigE to 5 GigE in the next 5 years and then 10 GigE and beyond. ALE expects backbone bandwidth in the campus network to increase to 100 GigE over this time frame
- **Evolution of the data center backbones:** We anticipate an evolution of data center backbones from 100 GigE to 200 GigE then to 400 GigE in the next 10 years
- **Improving Services and Network Resilience:** We will continue to evolve our network infrastructure in line with the service-oriented SPB-M standard, which optimizes network infrastructure design, performance, reliability, operation and maintenance
- **SD-WAN Operators:** WAN connectivity between sites and between healthcare facilities and

cloud service providers will be in the form of SD-WAN operators. The SD-WAN will deploy or change dynamically connectivity services based on demand
- **User & Endpoint Behavior Analysis - UEBA:** The infrastructure will offer new services to connect, manage and control the devices (BYOD) of various users, caregivers, staff, visitors and connected objects (IoT) while controlling the associated data traffic
- **Network Performance:** Analytics tools and APIs to dynamically manage networks to provide the level of quality required for a greater user experience
- **APIs between the IoT platforms and the network management system:** To allow the management of the physical and virtual network ensuring the traffic and connectivity of connected objects. In the future, we anticipate consolidation around cloud platforms like GE Predix. The hospital will be able to ensure compliance with current regulations of patient data processed by these platforms
- **Geolocation & BLE:** We anticipate the deployment of BLE infrastructures to support geolocation, wayfinding, equip-

ment tracking and other IoT applications.
- **New wireless protocols** (LoRA, LTE-M, ZigBee, BLE, 802.11ax, etc.) will be used by building management systems, patient monitoring (institution and home) and IoT applications. The hospital network will provide secure onboarding of the wireless devices through gateways, standalone or integrated in Wi-Fi access points, and will provide connectivity to the hospital data center or in the cloud.

To ensure the proper integration of tools and solutions, Alcatel-Lucent Enterprise offers application programming interfaces (APIs) in applications. These APIs are complete, documented and can be adapted to multiple situations.

The goal is not to upset your information system flow but to optimize it.

All these elements are offered in standardized and documented interfaces to facilitate their integration.

Examples of location-based service interfaces

ALE/Clepsydra project honored at AP-HP's and CHU of Nantes' "call for expression of interest" event

ALE along with Clepsydra, a company ALE has partnered with, were honored and recognized over 400 projects at a "call for expression of interest" event by AP-HP and CHU (University Hospital) of Nantes about the hospital of the future. The notable project involved pre/post-operative digital monitoring of patients and was presented to Agnès Buzyn, French Minister of Solidarity and Health, and Mounir Mahjoubi, French Secretary of State to the Prime Minister in charge of Digital technology.

This is the beginning of a future digital hospital. It starts with patient engagement with the hospital through human relationships, then coupled with a digital assistant that supports predictive, personalized and relevant medicine.

This solution:
- Simplifies and follows a patient's admission
- Follows patient departure and convalescence
- Collects data for improving medical protocols

Numerous partnerships and integrations are already in place, in this collaborative approach, Alcatel-Lucent Enterprise is a transversal link between the patient and professions, healthcare providers, and associated information systems.

Co-build with healthcare professionals

Alcatel-Lucent Enterprise co-builds your solutions with industry professionals. For example, the geolocation project (see previous chapters) and the Rainbow development of a social network dedicated to health professionals including:

- Status
- Newsfeed, instant messaging, voice, video
- Sharing of scientific documents
- Help in planning meeting (availability of resources)

Engage in a successful digital transformation

Digital transformation has the potential to redefine the way people, technology and machines interact and connect with each other in healthcare environments, to provide better care, reduce costs and improve patient outcomes.

By participating in Hacking Health Camps that aim to break down health innovation barriers, ALE has consolidated its vision and verified the relevance of its Rainbow CPaaS and Stellar Location-Based Services (LBS) APIs.

Thus, in March 2018 ALE took part in the biggest European Hackathon in Strasbourg (France). Several prizes were awarded by "ASIP Santé" (French agency of digital health), the Alsace Angels association and the Mylan laboratories to three projects integrating ALE solutions:

- Guidance for the visually impaired in a hospital environment using ultrasonic sensor technologies coupled with location-based services
- A virtual waiting room application based on a chatbot
- An application that mobilizes rescuers, enriched with location-based services

ALE is working to build an ecosystem of solutions articulated around the care pathway, providing connectivity, performance, security and network efficiency. In this context, ALE is therefore in essence open to any proposal for future collaboration.
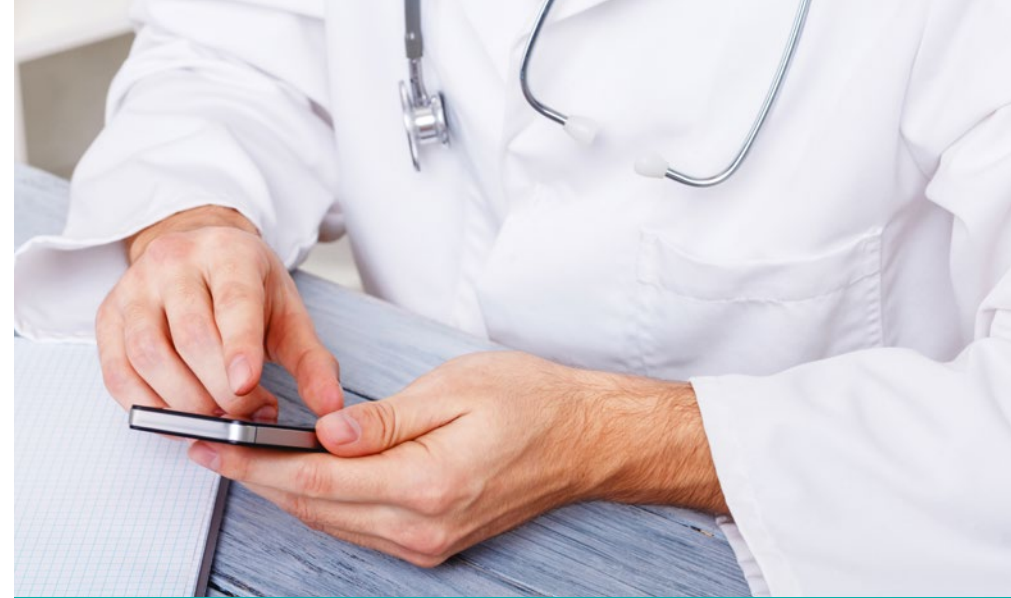
Conclusion

The field of eHealth is booming and represents one of the five strategic sectors for Alcatel-Lucent Enterprise. ALE connects all stakeholders in a collaborative approach with the patient for:

- A better experience in the hospital and healthcare facilities
- Efficient care and best use of treatments
- Permanence of care
- Access to patient data
- Improved collaboration with and between staff and the facility.

Via connectivity, Alcatel-Lucent Enterprise technologies work to optimize the quality of care while improving well-being at work for care professionals.

We are ALE. We help you Connect your patients, staff and healthcare ecosystem. Delivering technology that works across and beyond your facilities.
www.al-enterprise.com/en/industries/healthcare

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