interaction
healthcare

MedicActiV
A new approach to health training

The first digital simulation platform for health training

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I – Digital simulation – the future of medical training

A – Never the first time on the patient ... a goal for tomorrow's medicine

"Never the first time on the patient" is the motto that greets visitors on entering the Center for Medical Simulation (CMS) in the American city of Boston. This phrase "Never the first time on the patient" represents a strong ethical principle promoted by Prof. Jean-Claude Granry and Dr Marie-Christine Moll in their first proposal that appears in the report of January 2012 on medical simulation:

Proposal 1

Training by medical simulation methods should be incorporated into all education programmes for health professionals at all stages of their careers (initial and continuing training). An ethical goal should be given priority: **"never the first time on the patient".**

What is health simulation?

Health simulation is "using equipment (like a mannequin or procedural simulator), virtual reality or a standardised patient to recreate care situations or environments with a view to teaching diagnostic and therapeutic procedures and enable a health professional or team of professionals to practise processes, clinical situations or decision-making."

Mission report by the French National Authority for Health on the current national and international situation with regard to medical simulation practices that form part of continual professional development (CPD) and care-related risk prevention, January 2012.

Various forms of health simulation currently co-exist. A distinction must be drawn between organic and non-organic simulation. The first entails simulation with animals, cadavers (notably for surgical procedures) or live subjects (e.g. 'dramatised' simulations with patient-actors of consultations at which diagnoses of chronic diseases are announced) while the second uses substitution aids: mannequins, procedural simulators and new information and communication technologies.

Jérôme Leleu, CEO of Interaction Healthcare, the French leader in digital health simulation, believes that digital simulation represents the future of health training, free of the impassioned debates about patient consent. There are various reasons for this.

Firstly, it helps us comply with the ethical principle presented as a fundamental principle in the report of the French National Authority for Health.

Secondly, it allows knowledge to be disseminated in an appropriate way given current training constraints:

- delivered remotely

- delivered to several participants

- can be repeated, etc.

Finally, after initial training, it helps health professionals to retain knowledge and increase their expertise in an environment where patient management is over-specialised. *"The end goal of digital health simulation must be to improve patient management"*, says Jérôme Leleu. *"It supplements rather than replaces the various methods of initial and continuing training"*.

Indeed, health simulation and digital health simulation meets various training needs from initial training and knowledge acquisition to expert level and medical risk management.

B – Digital health simulation – expert perspectives...

"Digital simulation creates a link between theory and practice. Through virtual reality, it can address and assess the skills essential for future doctors and other healthcare professionals. The interactive and immersive character of digital simulation truly complements the education that students receive during their training".

Prof Patrick DEHAIL
MD PhD, Vice Dean, School of Medicine, School of Medical Sciences, Bordeaux

"Health digital simulation provides tangible solutions that recognize the human aspects in each patient instead of just seeing the bodies used as learning objects, sometimes without consent. It enables the emergence of a new rule, "never first on a patient." It is an opportunity to democratize health. Beyond the training of health professionals, health digital simulation could also become a training tool and support for patients, in addition to or as part of therapeutic education".

Yvanie Caillé
*Founder and Director of patients' association, **Renaloo***

"For patients, relatives, students and health professionals, digital is now available to all. In fact, it has become an essential information, teaching and education tool.
Within the CIS (Inter-professional Simulation Center), inter-professionalism is at the heart of our vision and our mission. By combining our expertise with those of new technologies teaching professionals, we are focused on developing a number of digital projects to serve students and healthcare professionals"

Grégory Cardot
Technical Manager of the Inter-professional Simulation Center, Geneva, European health simulation instructor

"Through continuing professional development, training activities that allow feedback to be provided to the learner on their medical practice is the way of the future. Digital simulation is a tool of choice".

Dr Vincent Jobin
CPD Manager, School of Medicine. University of Montreal

"It is still a concern, even if interns being trained are already familiar with the gestures, that always there will be a "first on the patient."

In the field of gastroenterology, where the gestures of endoscopy are common (colonoscopy, gastroscopy), digital simulation would be a remarkable contribution to our discipline.

There are, for example, simulation robots that allow students in training to become familiar with the gestures of a colonoscopy, but these solutions are still quite rare and expensive".

Dr Didier Mennecier
Hepato-Gastroenterology, Creator of the site Hepatoweb.com, 2015 National Academy of Medicine awardee

"Digital simulation represents a harmonized and diversified training offer by targeting all fields of activity of future therapists in preparation for their eventual placement. A course that meets healthcare regulatory requirement that will encourage the personal development of students in their initial training or the continuing education of professionals in order to improve the quality of care".

Prof Peggy Gatignol
Speech Therapist, PhD, HDR

"The possibility simulation offers to create or recreate clinical situations will enable all users, students and health professionals to learn by doing. Through repetition and analysis, it will strengthen their professionalism."

Sophie Alex-Bacquer
French Red Cross Manager

C – Benefits of digital simulation: immersion and interaction

The benefit of digital simulation, especially in a healthcare setting and beyond specific aspects relating to digital technology itself, lies mainly in the user interface. *"The user experience or UX as the experts refer to it is essential to the success of a digital health simulation programme"*, says Nathalie Pierard, MedicActiV project manager and educational engineer in the department of digital health simulation at Interaction Healthcare.

To encourage uptake of digital health simulation, an interface must be developed allowing end users, whether they be students or health professionals attending CPD, to properly express their needs and view usable results.

Immersion and interaction are therefore critical to the learning processes used in digital health simulation. Healthcare is a very specific area for digital simulation. The aim is not merely to recreate an industrial environment as is the case for industrial simulators or a technological environment like those used for training pilots in the aeronautical sector but to replicate a human reality as closely as possible.

"Our digital simulation department SimforHealth is especially keen to create links with academic stakeholders involved in computer science and medical research. This permanent monitoring and subsequent partnership work has enabled us to offer digital health simulation programmes reproducing virtual patients with genuine interaction using speech synthesis and chatterbots, says Nathalie Pierard.

Instead of being synonymous with the dehumanisation of medicine, the phrase "never the first time on the patient" should facilitate a patient-focused approach among health professionals. The idea is to effectively replicate conditions of immersion in real life and interaction with an individual.

II - MedicActiV – an open and scalable platform

"Consult, create and share virtual clinical cases when and where you want", Jérôme Leleu, CEO of Interaction Healthcare, believes that these words sum up the benefits of **MedicActiV**, the first digital simulation platform for health training

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Developed at SimforHealth, the Interaction Healthcare department of digital health simulation, **MedicActiV** is the first digital platform to:

- Offer virtual clinical cases allowing all health professionals - physicians, surgeons, medical students, interns, nurses, midwives, masseurs and physiotherapists - to **acquire or hone their skills**.
- Allow educational institutions – medical faculties, nurse training institutes, continuing professional development organisations, learned societies, etc. to create their own clinical cases with the help of SimforHealth teams or using PatientGenesys, an online generation engine.

A – MedicActiV – a response to multiple issues

Designed and developed over the past 3 years at SimforHealth, **MedicActiV** is the result of in-depth discussions and interaction with various communities of health professionals and educational experts.

It is the first platform enabling a response to multiple challenges:

- Meeting increasing needs for remote and collaborative initial and continuing training.
- Enabling all training organisations to develop their own clinical cases for computer-based simulation.
- Enabling as many people as possible to access computer-based medical simulation without the cost being inhibitive by examining an appropriate, long-term financial model.
- Developing a scalable model on a global level to enable France to retain and boost its appeal in terms of medical and paramedical training.
- Encouraging adoption of the model "never the first time on the patient" and the dissemination of knowledge with a view to improving patient management.

B – Training or honing skills with MedicActiV...

MedicActiV is a multi-modal platform developed to accommodate various training methods:

- Alone, at home, at the surgery ... while benefiting from an immersive experience.
- With others in the same room, all benefiting from a new, more participative educational experience.
- Remotely, in 'multi-player' mode to interact with students or health professionals in different locations.
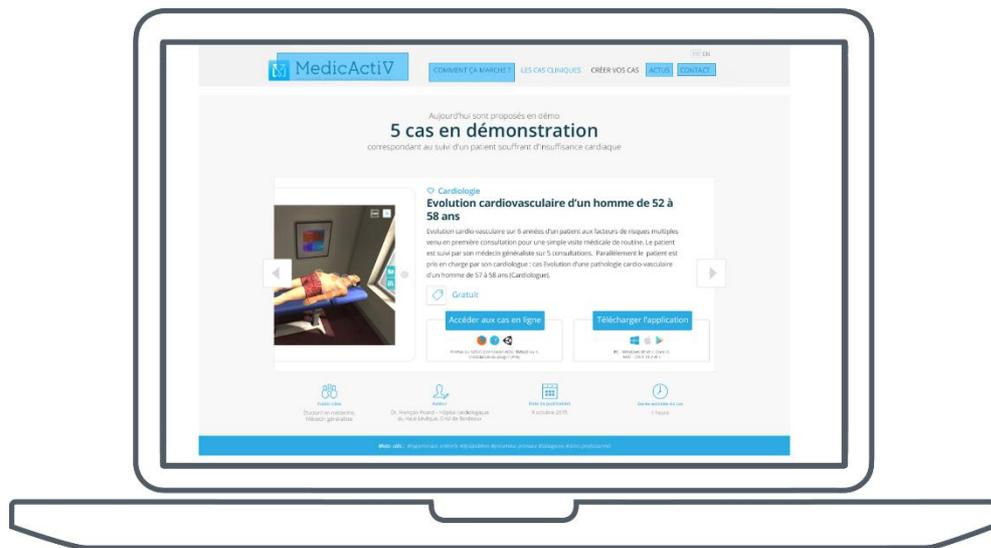
... in a few clicks.

After logging on to the **MedicActiV** platform, each student or medical professional can select the virtual clinical case they wish to use in order to train or hone their skills. Intuitive and ergonomic, **MedicActiV** helps users quickly find the relevant case or cases for their level of training or specialism or for a specific condition, treatment or situation in their required language (e.g. monitoring of a patient suffering from atrial fibrillation by his family doctor or private practitioner; management of postnatal perineal rehabilitation by a masseur-physiotherapist, etc.).

Moreover, it is possible to use these cases in the platform's web app using a web browser (Firefox, Safari, Internet Explorer), on a tablet and even download them onto your own computer, like stand-alone software.

C – Creating virtual clinical cases on MedicActiV…

Developed to enable teachers to make their training more interactive by offering immersive clinical cases, **MedicActiV** offers two approaches for creating and sharing virtual clinical cases.

1. A tailored approach with **SimforHealth**

   In this configuration, the virtual clinical case is developed by SimforHealth, the Interaction Healthcare department of digital health simulation, in a completely customised manner, incorporating specific technologies where necessary (modelling, advanced immersive mode, etc.). This type of development entails specific cases being produced in partnership with medical teams.

2. An integrated case generation engine: **PatientGenesys**

   PatientGenesys is an online virtual clinical case generation engine that emerged from a collaborative research programme selected for FUI 16 (a French government programme funding applied research).

   The aim of the Interaction Healthcare-led consortium that includes the Simulation Centre at Angers teaching hospital (medical expertise), Vidal (access to recommendations), Voxygen (speech synthesis) and LIMSI-CNRS (chatterbot) is to enable health professionals, trainer physicians and other individuals to create virtual consultation cases or computer-based clinical cases. PatientGenesys, which is due to be integrated in the **MedicActiV** platform in mid-2016, will make it easy to create new 3D medical training tools.

   Indeed, with PatientGenesys, users can select a virtual patient (male, female, age, 3D environment, etc.), select the consultation stages, enter the necessary information to address the clinical case (medical records, clinical examination, treatments, recommendations, additional examinations, etc.) before rendering the clinical case.

   PatientGenesys then generates a virtual consultation that includes all the specified data, renders it in 3D and incorporates speech synthesis and the chatterbot to make the consultation as real as possible.

... and choosing a model for sharing

A completely open and modular platform, **MedicActiV** also allows innovation in terms of the financial model of digital health simulation.

Each 'editor' or designer of virtual clinical cases has the option of defining a financial model that suits them:

- A faculty of medicine can create cases and provide its students with free access to them. Similarly, a learned society may decide to enhance its members' CPD by offering them reserved access to the cases it produces.
- Another faculty or nurse training institute may decide to offer its virtual cases free-of-charge to its students while also providing them to students of other French or French-speaking faculties for a fee.
- A Regional Health Agency may deploy a computer-based medical training solution using various cases focused on one of its regional health priorities and offer this free-of-charge to health professionals in its jurisdiction while also providing this to other health professionals from other regions if these regions undertake to do the same with the clinical cases they develop and provide to view and download on **MedicActiV**.

Whatever model is chosen, designers remain in control and can make adjustments based on their own criteria. The payment model can be adapted to any individual requirements (subscription based on the number of students able to access the cases, a percentage based on cases sold, etc.)

D – Focus: The first cases – a collaborative concept...

As well as providing the platform itself, Interaction Healthcare wanted to make it operational by immediately offering various virtual clinical cases. Therefore, based a call for projects and financial backing from the Region of Aquitaine, the digital health simulation department entered a partnership with the Heart Failure Treatment Unit at Bordeaux teaching hospital and the Carmen team from the Inria research centre for south-western France to offer 5 clinical cases for the launch of **MedicActiV**. These cases will enable GPs, cardiologists and emergency physicians to test the platform's full potential while honing their skills managing a patient suffering from heart failure.

This principle of partnership established from the outset shows the benefits that **MedicActiV** is capable of offering. Indeed, medical expertise from the Heart Failure Treatment Unit of Bordeaux teaching hospital and the Hospital-University Institute of Cardiac Rhythm Study and Cardiac Modelling (IHU LIRYC) was used to create digital simulation cases incorporating all stages of information gathering, analysis and management of genuine cardiopathy situations.

Inria's contribution was just as important. Thanks to the Carmen project team, which specialises in modelling and calculations for cardiac electrophysiology, each user of the jointly produced clinical cases can view models at key stages of the virtual patient's cardiovascular disease development and view the associated electrical propagation and ECGs. This is inconceivable in real life and helps students assimilate knowledge by putting it in a practical context.

… that heralds the future

These first 5 cases allow users to operate the **MedicActiV** platform and precede a forthcoming library of virtual clinical cases which will be available for all medical disciplines and specialisms: allergy/immunology, surgery, dermatology, endocrinology, gastroenterology, genetics, geriatrics, haemotology/oncology, infectious diseases, nephrology, neurology/neurosurgery, obstetrics/gynaecology, ophthalmology, orthopaedics, ENT medicine, paediatrics, respiratory medicine, hospital care, psychiatry, rheumatology, urology, etc.

*MedicActiV • Clinical case no. 4 • **Cardiology, general medical consultation***
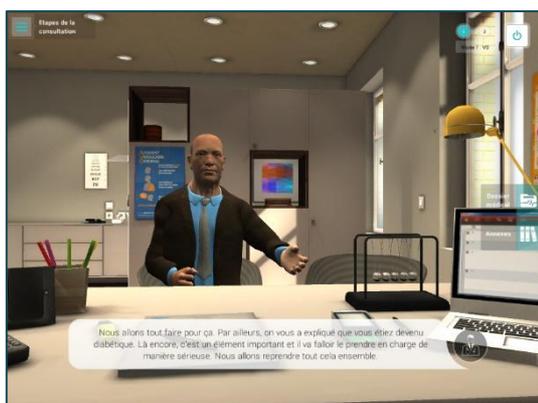
Having been admitted to hospital for auricular fibrillation and a defibrillator implant with resynchronisation and attended a rehabilitation centre, a 53-year-old patient consults his GP. Issues addressed: reassessment of diabetes and prevention of decompensations

III - From its origins in Aquitaine, MedicActiV is rolled out at global level

A – MedicActiV – a platform with an international focus

MedicActiV, the first platform for consulting, creating and sharing 3D virtual clinical cases, was developed in the Interaction Healthcare digital health simulation department, SimforHealth. Interaction Healthcare is reliant on this department based in the French region of Aquitaine for its international growth.

One of 10 digital health simulation operators around the world, Interaction Healthcare has big plans for **MedicActiV**.

"From the outset, our computer-based medical simulation platform will be accessible in French and English. It will therefore be possible for English-speaking research organisations to create clinical cases for their students, who may for instance be American or Australian health professionals. Moreover, MedicActiV offers centres of excellence like French medical schools and teaching hospitals to promote their educational and medical expertise around the globe", adds Jérôme Leleu.

In the medium term, **MedicActiV** is therefore planning to develop its provision of clinical cases in French while also opening specific sections first in English and subsequently in other languages. This will be achieved through partnerships with training organisations (universities) or care institutions (hospitals) in Canada, the United States and Europe. There are also plans to expand into China and Brazil where the initial contact made has been very promising.

B – a major player pushing forward digital health simulation

Set up in 2008 by Jérôme Leleu and Danielle Villedieu, Interaction Healthcare has quickly become a major e-health player and the French leader in digital simulation and serious games for health.

Indeed, with offices in Bordeaux, Paris, Montreal (Canada) and Rouen, Interaction Healthcare has access to a wealth of expertise. 18,000 health professionals have already been trained using one of its solutions. Interaction Healthcare is the winner of the Deloitte In Extenso Technology Fast 50 award for France. The company was identified by the BPI France Excellence network as one of the 2,000 most innovative French companies and is 256th in the European ranking of the fastest-growing companies over the past 5 years.

In order to deploy MedicActiV globally and consolidate its growth at 20% in 2014 and 30% in 2015 with turnover of €4 million, Interaction Healthcare will begin a new capital-raising campaign in early 2016 with a view to raising €2.5 million.

"France has a number of fantastic e-health startups. Interaction Healthcare is one of them thanks to SimforHealth, its department of digital health simulation. digital health simulation presents a genuine opportunity to promote French medical expertise, our researchers' outstanding technological skills and our ability to innovate while creating value and jobs in our country".

Jérôme Leleu, CEO of Interaction Healthcare

IV • MedicActiV – key facts

• First international digital health simulation platform:

  • Virtual clinical cases viewed in 3D

  • Ad hoc cases created by the Interaction Healthcare digital simulation department SimforHealth

  • Online virtual clinical case generation engine: PatientGenesys (available from mid-2016)

  • Publication and sharing of clinical cases defined using the platform

• An open platform:

  • Training catalogue permanently being developed

  • Multilingual

  • The financial model for sharing is chosen by editors of clinical cases

• A collaborative approach:

  • The first clinical cases: with financial backing from the Region of Aquitaine, the Hospital-University Institute of Cardiac Rhythm Study and Cardiac Modelling (IHU LIRYC) and the Heart Failure Treatment Unit of Bordeaux teaching hospital

  • PatientGenesys: a consortium comprising the Simulation Centre at Angers teaching hospital, Vidal, Voxygen (speech synthesis), LIMSI-CNRS and Interaction Healthcare.

• 3 years' research and development (2 years specifically on development)

For more information:
  • MedicActiV: www.medicactiv.com
  • Interaction Healthcare: www.interaction-healthcare.com and its computer-based medical simulation department SimforHealth www.simforhealth