

PRESS RELEASE

Clermont-Ferrand – December 1, 2020

Michelin provides four French hospitals with air cushion prototypes to improve the ventilation and comfort of patients in intensive care

- **50 air cushion kits developed jointly by Michelin and the Amiens-Picardie University Hospital are now available in the intensive care units of four French hospitals**
- **Leveraging agile development with a startup approach**
- **Developing day-to-day applications for pneumatics in new sectors, including healthcare**



Four months after development began in collaboration with the Amiens-Picardie University Hospital, Michelin has supplied the intensive care units of four French hospitals with 50 air cushion test kits. The cushions are currently being tested in two public hospitals in Paris (Pitié-Salpêtrière and Beaujon), as well as the Amiens-Picardie and Clermont-Ferrand university hospitals (Estaing and Gabriel Montpied units).



Intended for patients suffering from respiratory distress (in a medically induced coma and placed on a ventilator), the new air cushions mean patients can be treated in prone position (lying face down) for better ventilation of the lungs. The kits also improve patients' comfort and prevent pressure sores from developing on their chest, pelvis or face.

As early as March, Michelin was quick to mobilize several task force teams in response to an appeal from cardiac surgeon Dr. Gilles Touati from the Amiens-Picardie University Hospital, working in agile cooperation to meet urgent needs.

"We were confronted with the problem of patients in respiratory distress who had to be ventilated in a prone position on their stomach if there was to be any hope of improvement. However, placing patients in a face-down position caused serious pressure sores which meant the treatment sometimes had to be stopped. I didn't think long and hard but what immediately came to mind was an inflatable structure made up of different modules for different parts of the body (head, chest, pelvis and lower limbs) and I sent a message to Michelin. I got an instant reply and their responsiveness was remarkable!" says Dr. Touati.

Michelin tackled this new project by immediately forming a team of six, bringing together R&D expertise from a range of sectors (textiles, plastics, modeling) and input from an innovation lab to provide a design thinking, iterative and user-centric process for the project.

The Michelin team then spent time at SimUSanté®, Europe's largest healthcare simulation and training center, which is part of the Amiens-Picardie University Hospital. There they tested the apparatus in realistic conditions, including using equipment and techniques on instrumented dummies or simulated patients outside of an actual patient care environment. This key step allowed them to develop a prototype.

The air cushion kits are made up of seven modular components that can be arranged to suit different patient morphologies. They come in different shapes and sizes and can be inflated to varying degrees to accommodate a patient's chest size and other fragile parts of the body. Two patents have recently been filed.

"Thanks to this development – which was completed in a very short space of time through regular video-conference meetings – several prototypes were created and tested on patients in order to obtain an extremely advanced modular structure that allowed us to reduce and even eliminate pressure on different parts of a patient's body as well as the risk of sores. It also helped to improve mechanical ventilation, which was unexpected and another excellent benefit," says Dr. Touati.

"Our critical care resources have been disrupted and overwhelmed by the current health crisis, and this productive collaboration with Michelin has allowed us to develop versatile alternatives to the equipment we use for patients in acute respiratory distress who need to be kept lying face down," adds Dr. Thomas Godet from the Clermont-Ferrand University Hospital.

"All of these initiatives, sponsored at the highest level of the Group and driven by the commitment of various teams determined to put their support and expertise to the best possible use in the race against time, are another reflection of the importance Michelin places on people and their health and well-being. It's one of our fundamental values. The development of these air cushion kits also highlights Michelin's capacity for innovation and the potential bridges that exist between tire manufacturing and a multitude of other sectors like the healthcare industry for example," explains Philippe Jacquin, in charge of the task force and Director of Development for Two-Wheel and Automotive Tires at Michelin.

This program to develop air cushions is yet another example of Michelin's initiatives to fight the pandemic, alongside reusable masks, 3D-printed components for artificial ventilators and production of protective visors.

Click here to see the photos and videos:

<https://contentcenter.michelin.com/portal/shared-board/9950262b-d47b-4e7f-ae7f-d3d3320c56f3>

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About Michelin

Michelin, the leading mobility company, is dedicated to enhancing its clients' mobility, sustainably; designing and distributing the most suitable tires, services and solutions for its clients' needs; providing digital services, maps and guides to help enrich trips and travels and make them unique experiences; and developing high-technology materials that serve a variety of industries. Headquartered in Clermont-Ferrand, France, Michelin is present in 170 countries, has more than 127,000 employees and operates 69 tire production facilities which together produced around 200 million tires in 2019. (www.michelin.com).

About Amiens-Picardie University Hospital

The Amiens-Picardie University Hospital is a center of excellence in healthcare, with four missions: care provision, research, teaching, and the management of regional healthcare supply and demand.

It is one of two university hospitals in the Hauts-de-France region, and is the leading employer in the Picardie area.

The hospital is a benchmark establishment that serves its immediate catchment area and the whole of Picardie for referrals (transplants, oncology, conventional and outpatient surgery, level 3 maternity, emergency medicine, etc.), whose dynamic, innovative teams have won many national and international awards and distinctions.

As a major player in medical training, the Amiens-Picardie University Hospital proactively contributes to medical and pharmaceutical student curricula. It is also home to 16 nursing college training centers and a world-renowned simulation center (SimUSanté®).

Backed by an ambitious research and innovation program, the hospital is committed to a dynamic investment policy that seeks to provide safe, high-quality care for every patient.

It is fully committed to hospital-private practice collaboration, and leads the "GHT Somme Littoral Sud" hub of 10 public-sector healthcare establishments. It also promotes regional synergies and the development of new skills and know-how.

Amiens-Picardie University Hospital: excellence in healthcare.

<http://www.chu-amiens.fr>

Amiens-Picardie University Hospital: key figures for 2019

Over 800,000 admissions per year.

1,664 beds.

6,396 staff, including 832 physicians.

471,900 outpatient consultations.

33,458 surgical procedures in 33 operating theaters.

104,207 admissions to the emergency department.

2,375 births.

16 training colleges and schools.

About the SimUSanté® healthcare simulation center

SimUSanté® is an innovative learning space in the initial training and continuing education of all healthcare stakeholders, from professionals to patients and caregivers. Developed by the Amiens-Picardie University Hospital in partnership with the Jules Verne Picardie University, it is supported by a large number of partners. In 2012, SimUSanté® was awarded the *Initiative D'Excellence en Formation Innovante* (Initiative for Excellence in Innovative Education) and a subsidy from the French National Research Agency (ANR) for its creation and development.

Located at the center of the Amiens Healthcare Hub, its 4,000 sqm campus houses high-tech training and educational equipment and meticulously reconstituted work environments (home, pharmacy or hospital). Its 51 simulation areas (43 rooms are equipped with video and sound systems, 15 with one-way mirrors) spread over three floors, with gesture training rooms, multimedia centers and real-life situation settings, make it the largest multidisciplinary healthcare simulation center in Europe.

SimUSanté® focuses on public healthcare priorities (disability and dependence, cancer, metabolic and cardiovascular disease, etc.), and offers specific training and resources for homecare providers, family caregivers, patients and patient associations to help those in care return home as soon as possible or stay at home for as long as possible.

The center continues to lend every assistance in tackling the current pandemic and providing simulation training for all healthcare professionals dealing with suspected or confirmed cases of Covid-19. Training is open to all health industry professionals (public sector, private sector, employees or self-employed), students and trainees.

Director of Sciences and Care, Professor Christine Ammirati, Director of Care and Coordinator of Schools and Institutes, Béatrice Jamault.

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