PRESS RELEASE

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LATEST NEWS:
Automatic 3D modelling of the lung to fight COVID-19

Plus Forts
GRAND EST

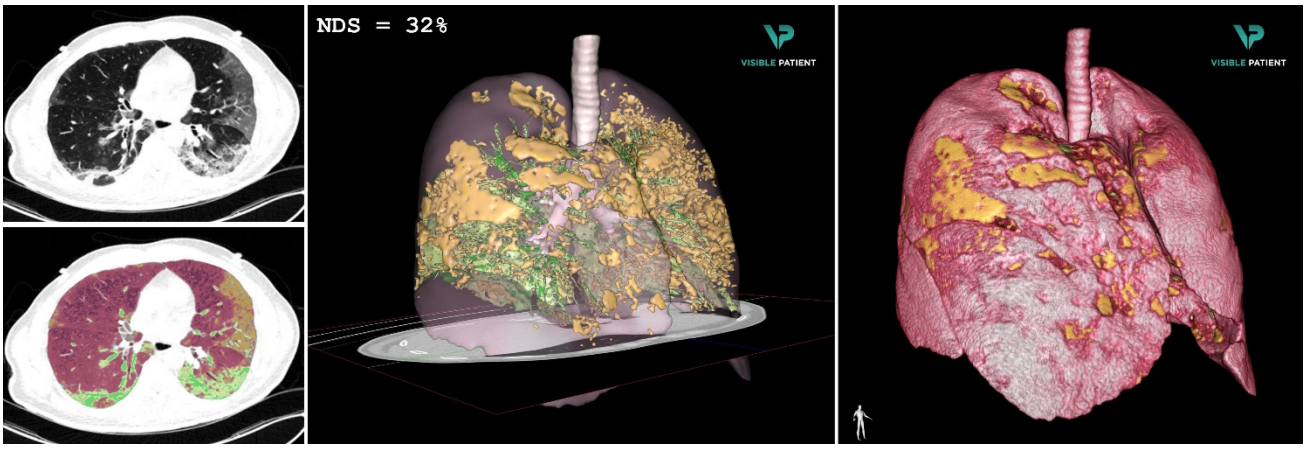
Towards a New Diagnosis of Severity

In March 2020, to respond to the emergency of the Covid-19 epidemic affecting mainly the lung, Prof. Luc Soler, president and cofounder of **Visible Patient, first laboratory for online 3D analysis of medical images,** Dr. Eric Noll and Prof. Pierre Diemunsch, from the intensive care, anaesthesia and perioperative medicine unit of the Strasbourg University Hospital, have developed **a cooperation aiming to provide a precise and fast automatic measurement of lung damage to deduce a new diagnosis of severity**.

Thus, they have developed a new severity score of the pathology computed for each patient from the 3D model extracted from his/her CT-scan by Visible Patient of healthy and damaged lung areas.

The first retrospective study conducted on 40 patient files within the Strasbourg University Hospital shows a correlation between this new diagnosis of severity computed upon admission of patients to emergency wards and the severity of their damage by the virus 7 days later.

Severity level of lung damage is revealed and, above all, precisely quantified thanks to the 3D model performed by Visible Patient from a CT-scan of the patient.



From an X-ray scan (left), result of the online 3D analysis by Visible Patient providing the 3D model of pathological areas in lungs (orange and green) and the new diagnosis of severity NDS, here 32%.

To confirm these first results, the Grand Est Region decided in April to finance the clinical phase of the Covid19 NDS project conducted on 1000 patients.

The multicentric study will be coordinated by the same actors with addition of the radiological department of the Regional Hospital Group of Mulhouse and South Alsace and the intensive care and anaesthesia department of the Brabois Hospital in Nancy.

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The Covid19 NDS project:

France and the world fight against an unprecedented pandemic linked to the Covid-19 virus, the main clinical sign of which is a pulmonary attack.

Currently available diagnostic tests are solely composed of molecular biology analysis (RT-PCR) on the sampling of respiratory secretions.

These tests are limited by:

- Their unavailability
- Their reliability
- The lack of any information about the severity of lung infection.

To overcome this limitation, it is essential to have immediately large-scale tests allowing to know more precisely the severity of the lung damage and to predict the evolution of the patient's state of health.

The Covid19 NDS project – New Diagnosis of Severity – aims at providing a **fast, quantitative and precise measurement** of the volume of damaged lung from a medical image, **an automated radiological diagnostic testing does not require biological sampling of the patient.**

This measurement relies on the one hand on qualitative **X-ray scan medical imaging realized by radiologists** and on the other hand on the **analysis service of the Visible Patient company**, **first laboratory for online 3D analysis of medical images,** who from a simple CT-scan of the patient realizes the digital clone of his/her lungs.

The enormous advantage of this analysis is linked to the precise automatic delineation of each infected lung area.

It allows to define the remaining functional volume as well as the damaged volume, in particular an area referred to as "ground glass" which is systematically found in case of Covid-19 infection. It is from these **3D models of pathological and healthy lung areas** of each patient that Dr. Eric Noll, Prof. Pierre Diemunsch and Prof. Luc Soler have defined and patented a **new diagnosis of severity** (NDS), score allowing to match computed volumes and the real state of health of the patient.

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A new diagnosis of pathology severity which should make it possible to predict the state of the patient in 7 days upon hospital admission

The first study conducted on 40 patient files has showed a precise correlation between this new score computed upon admission of patients to emergency wards and their state of health, and thus the severity of the pathology 7 days later.

The stake of this project will be to validate and confirm on a larger number of patients the predictive property expected by intensive care and anaethesia teams to optimize patient care thanks to this new computation of **the severity level of lung infection**.

Within the context of major crisis we are going through, it would represent an exceptional tool to rapidly and automatically diagnose the severity level of the pathology and tomorrow to choose the best suited therapies for each case.

All the more since this solution can be used beyond Covid-19 for other lung damage pathologies.

This project, co-financed by the **GRAND EST REGION,** coordinated by **Visible Patient** in partnership with **the intensive care and anaesthesia unit of the Strasbourg University Hospital**, will involve several clinical departments of the **Strasbourg University Hospital,** of the **Regional Hospital Group of Mulhouse and South Alsace** and of the **Nancy Brabois University Hospital,** with the support of the **Strasbourg company e-Media** for the secure inter-hospital transfer of study data.

The Visible Patient start-up makes patient organs visible in 3D.

First secure online service allowing to transform a CT-scan or MRI image into a 3D copy

Size and shape of organs vary from one person to another. **Visible Patient** , a, IRCAD' Spin-Off (the Strasbourg Research Insitute Against Digestive Cancer of Prof. Jacques Marescaux) reconstructs the patient anatomy as a 3D colour model from his/her black and white 2D CT-SCAN or MRI. The surgeon can then simulate the ideal surgical intervention from this 3D digital clone, share it with other physicians and also the patient.

Visible Patient facilitates the dialogue with the medical team, simplifies interpretation of medical images to confirm or optimize the choice of therapy, secures the surgical intervention by allowing simulation before surgery.

Visible Patient is now available for most digestive, thoracic, urologic and paediatric surgeries.

In France, 3D models realized for surgery are 100% covered by several private health insurances, and in 2020 more specifically Assurances Crédit Mutuel, MRTL, l'AG2R la Mondiale, AG2R ARPEGE, Energie Mutuelle, Groupama and Allianz France.

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