PRO-COVID: a patient-reported outcomes tool to improve the follow-up of COVID-19 suspect, positive and post-hospitalized patients

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BACKGROUND

COVID-19 pandemic is the biggest threat to global health in the last 100 years. The majority of the patients infected by SARS-CoV-2 are pauci-symptomatic or with mild symptoms. Yet, when the symptoms worsen, prompt intervention is required to halt the progression of the disease and the overloading of acute care structures, like intensive care units.

As such, a close clinical follow-up of infected patients must be performed. Telemedicine systems (e.g., HUG@home) that allow keeping appointments with patients followed at the Geneva University hospitals have already been developed and deployed.

However, with the sustained growth of cases that is verified in Geneva and the stress it poses to health care structures, a clinical follow-up of all infected patients is not yet feasible. Also, depending on the availability of COVID-19 tests, testing criteria change periodically; many patients suspect of COVID-19 will not be tested and will need specific close follow-up. Moreover, an increasing number of patients will be released after hospitalization (post-hospitalized patients), and a safe follow-up will be crucial for early discharge.

As such, using patient-reported outcomes to monitor the evolution of COVID-19 patients could help streamline their clinical follow-up and allow better allocative efficiency of health care resources during this crisis period.

The PRO-HUG project started in March 2019, intending to develop a platform to record patient-reported outcomes of patients with cancer treated at the HUG. This tool is now available and functional. As with other telemedicine tools available at HUG, we believe the PRO-HUG platform could be repurposed during these times of crisis to tackle the challenges posed by this pandemic.

PRO-COVID will be integrated into CoviCare, a project (HUG, AMGE, Direction Générale de la santé) of standardized follow up of all suspect, positive and post-hospitalized patients in the Canton of Geneva. In a first phase we will develop this tool for patients cared at the HUG. After correct implementation and proving clinical utility, the tool will be made available to other testing sites and physicians of Geneva.

OBJECTIVES

We aim to implement a patient-reported follow-up system of COVID-19 patients in Geneva, allowing rapid identification of clinical deterioration or improvement.

Target population

At the time of writing this proposal (22.3.2020), 1084 people have tested positive for SARS-CoV-2 in Geneva. Approximately 20% (n=200) are hospitalized while the other 80% are in home confinement.

This number will continue to increase until the peak of the epidemic is reached with the exact date still to be determined.

Inclusion criteria

1. All patients that have a positive test for SARS-CoV-2
2. All patients that had a swab and that are awaiting the results of the test
3. All patients with symptoms but who could not be tested (suspect cases)
4. All COVID19 patients discharged from hospitals

Exclusion criteria

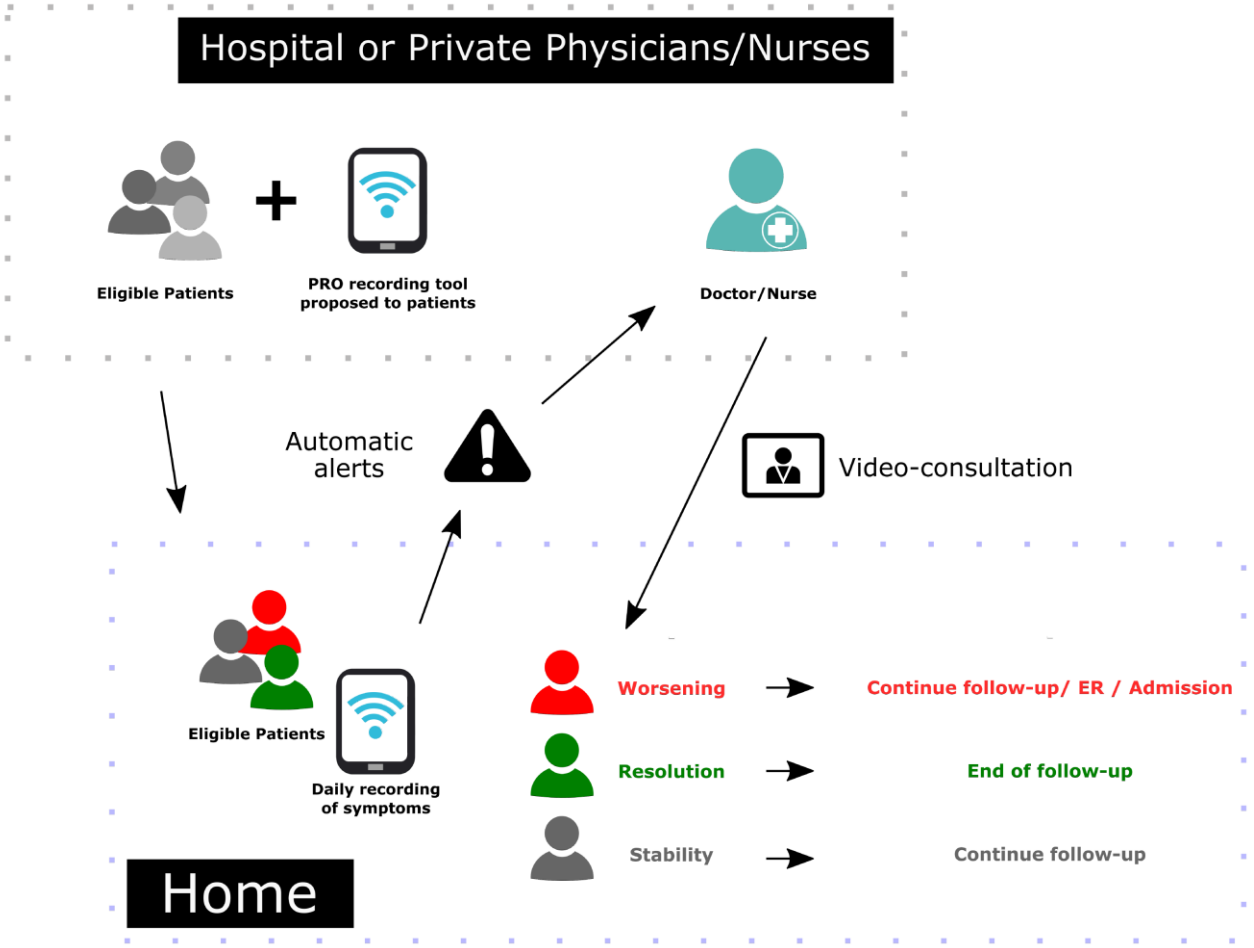
1. Patients with criteria for hospital admission
2. Patients that can't read

3. Patients that can't read French, German, Italian, English or Spanish

End-of follow-up

4. Negative test
5. For positive and suspect cases: the absence of fever or severe symptoms (dyspnea, extreme fatigue) for more than 3 days (current recommendation is 48h)
6. For patients hospitalized for COVID19: end of follow up determined by clinicians when patients discharged

OPERATIONAL FLOWCHART



a) **Phase I:** at the emergency department of the hospital or at discharge from hospitalization;
Phase II: when patients see a private doctor/nurse; those satisfying the inclusion criteria are proposed the PRO-COVID for home monitoring of symptoms. In order not to overburden the healthcare workers, patients will be able to autosign up to the system.
b) Patients receive a daily questionnaire to report information on signs and symptoms (fever, dyspnea, cough, fatigue, appetite)
c) The software automatically flags patients with worsening symptoms, and a dedicated PRO-COVID health professional receives an alert
d) The PRO-COVID health professionals call the patient for an initial assessment
e) According to clinical evaluation, the patient is either suggested to continue follow-up, come to the emergency room where a team will be waiting for him or hospital admission
f) Patients that fulfill the end of follow-up criteria will stop receiving the questionnaires and excluded as active users of the platform
g) Those that show persisting symptoms but are not clinically worrying (e.g., intermittent fever but no other symptoms) will continue to be followed up

REQUIRED RESOURCES

- Secure server space according to the volume of patients being followed
- Implementation of patient questionnaire specific to COVID-19
- Implementing an autosign up procedure that is secured by a two factor authentication system to avoid spam
- Establishment of an alarm system for quick screening of clinical worsening or improvement
- Nurse/Medical doctor that receives and is responsive to the alarms

REQUIRED ACTORS

- Department and Division of Primary Care Medicine (HUG) and all private healthcare partners (e.g., AMGE) of the Canton of Geneva – required clinical staff to ensure a response to the alarms
- Information Systems Directorate – server space if required
- Kaiku Health – compassionate implementation of the necessary questionnaires and server space if possible

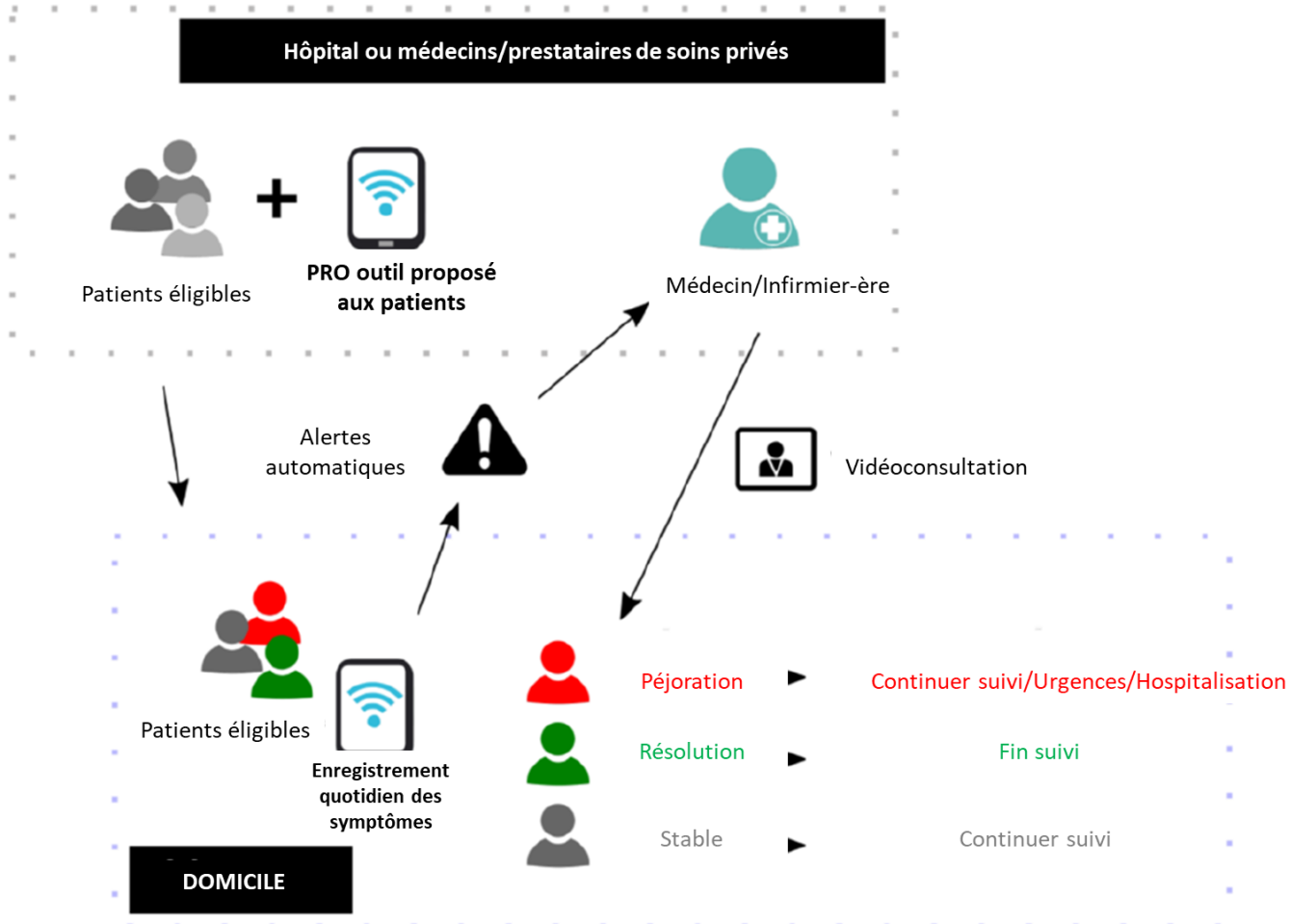
INTEGRATION WITH EXISTING STRUCTURES

- PRO-HUG: the PRO-COVID can use the existing platform of PRO-HUG, which already enables HUG patients to be enrolled in a PRO registering platform. The data is stored in a secure server. The authentication process, data collecting, and storage have been certified as safe by the HUG Security Officer.
- HUG@Home: this teleconsultation software is already in use at the HUG allowing secure communications between HUG doctors and patients.
- Division of Primary Care Medicine: as the prime motor of this initiative and one of the critical elements in COVID19-response in HUG, the DPCM would render available a health professional for the follow-up of ambulatory COVID-19 patients. Similarly to HUG@home, access will be open to all private healthcare professionals of the Canton of Geneva (HUG@home has been adapted to docteur@home for being used by private physicians to increase the volume of providers, more than 300 privates physicians enrolled already in docteur@home)

PATIENT REPORTED OUTCOMES PRO-COVID FRANÇAIS

Chaque patient dont le diagnostic de COVID-19 est suspecté ou confirmé peut bénéficier d'un questionnaire en ligne facilement accessible par téléphone ou sur le Web. Une fois le processus d'authentification effectué par SMS, le patient reçoit un questionnaire chaque jour pour renseigner ses symptômes. L'équipe médicale reçoit ensuite des alertes si les de nouveaux symptômes apparaissent ou en cas d'aggravation des symptômes pré-existants selon un algorithme soigneusement conçu.

Cette application / ce processus peut identifier rapidement les symptômes type signes d'alerte avant l'aggravation de l'état général et peut ainsi aider à la réorientation et prise en charge des patients.



REPORTE DE EVENTOS POR PARTE DEL PACIENTE – ESPANOL

Todo paciente con un diagnóstico sospechoso o confirmado de COVID-19 puede beneficiarse de un cuestionario en línea al que se puede acceder fácilmente por teléfono o a través de un sitio web. Una vez que se ha realizado el proceso de autenticación por medio de un SMS, el paciente recibe un cuestionario cada día para proporcionar información sobre sus síntomas. El equipo médico recibe entonces alertas si aparecen nuevos síntomas o si empeoran los síntomas preexistentes según un algoritmo cuidadosamente diseñado.

Esta aplicación/proceso puede identificar rápidamente los síntomas y signos de alerta antes de que el estado general empeore, y puede de esta manera, ayudar en la reorientación y el manejo de los pacientes.