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Chapter

SARS-COV-2 Pandemic: How to Maintain a COVID-free Hospital

*Marco Bassanello, Ugo Coli, Antonio Tegov,
Maria Teresa Pasqualini, Aldo Farencena, Matteo Geretto
and Maurizio D'Aquino*

Abstract

The emergence of severe acute respiratory syndrome type 2 coronavirus (SARS-CoV-2) and its complications have demonstrated the devastating impact of a new infectious pathogen since the first months of 2020, especially on Health Systems. The work to maintain a COVID-free hospital in terms of reorganization of operational processes and surveillance against SARS-CoV-2 has allowed us to maintain the structure suitable for activities for non-positive patients. The commitment related to this reorganization (not only in terms of costs) is largely satisfied by the responses to the health needs of non-COVID patients. The results obtained during the First Pandemic phase at the Giovanni XXIII Hospital in Monastier di Treviso have allowed the maintenance of the status of a COVID-free hospital. These results are supported by multiple studies in other parts of the world.

Keywords: SARS-CoV-2, COVID hospital, COVID- 19, coronavirus, pandemic, vaccines, immunity

1. Introduction

COVID-19 [1] (acronym of Coronavirus Disease 19), or Severe Acute Respiratory Syndrome from SARS-CoV-2 or more simply Coronavirus disease 2019, is an infectious respiratory disease caused by the virus SARS-CoV-2 belonging to the Coronavirus family. The first cases were found in China (Wuhan Province) during the COVID-19 pandemic of 2019–2020 [2]. Coronavirus mainly affects the lower respiratory tract with flu-like symptoms [3, 4], such as fever, cough, shortness of breath, muscle pain, fatigue and diarrhea [5]; up to pneumonia, ARDS, sepsis and septic shock, and death of the patient. More studies indicate the endothelium as the virus site of the attack, therefore the involvement is systemic. A mass vaccination campaign is underway with two types of vaccines: mRNA and protein vaccines. Currently, treatment consists of isolating the patient and managing clinical symptoms [3]. An infected person may present symptoms after an incubation period that can vary between 2 and 14 days approximately (although there have been cases of 29 days), during which they can still be contagious [6, 7]. To limit its transmission,

precautions must be taken, such as adopting careful personal hygiene, washing hands frequently and wearing Personal Protective Equipment (PPE) [8]. Those who believe they are infected must remain in quarantine, wear a surgical mask and call a doctor immediately in order to receive appropriate guidance [4, 9]. Today monoclonal antibodies and antivirals prevent serious complications when taken in the first days of infection [10]. But the only weapon in our possession is the isolation of infected communities. Due to its characteristics, a hospital is the structure with the greatest risk of transmission of pathogenic microorganisms, due to the high number of users, the permanence of many of them in the wards or common areas (emergency room, polyclinics), invasive diagnostic-therapeutic procedures to which patients are subjected and the immunosuppression state of many of them. The occurrence of epidemic clusters within hospitals can lead to such serious consequences that it is essential to take all necessary measures to prevent these. In the United Kingdom, during the second wave, some hospitals were defined as COVID-free Hospitals in order to guarantee the National Health Service (NHS) the possibility of treating cancer patients or other diseases, without suspending elective management as during the first pandemic wave. In fact, this approach was criticized by doctors and charities as it would increase the number of deaths and slow down millions of elective treatments in an unsustainable manner. The March closures allegedly denied vital care to non-COVID patients, with the exclusive treatment of COVID-positive patients. Planned treatments such as oncological surgery, joint prosthetic surgery, and ophthalmic surgery were discontinued. According to the NHS, a COVID-free Hospital should have been kept as free as possible from COVID-positive patients, unlike what happened during the first pandemic wave. This should also have reduced the risk of patients hospitalized for normal care being infected with COVID-19 while inwards. In north London, Whittington Hospital has designated a COVID-free site. It did not receive infected patients so that it could make time for planned non-urgent surgeries. COVID-19 patients would have been treated at University College London hospital or the nearby Royal Free hospital. Likewise, for hospitals in northwest London. In fact, millions of people have been denied NHS assistance after the fight against the coronavirus became a priority in the first wave. A record total of more than 2 million people - three times the figure from the same period last year - had to wait more than 18 weeks to begin hospital treatment in England, according to data from that period. Some hospitals, however, continued to provide COVID and non-COVID care in the same facility while maintaining strict infection control (by The Guardian of 21.09.2020 "Some hospitals in England to be kept COVID-free in second wave").

During the Italian pandemic of February–April 2020, the small hospital "Giovanni XXIII" in Monastier di Treviso, in the province of Treviso, was declared COVID-free by the local health authorities.

During this pandemic phase, SARS-CoV-2 circulated in this territory involving about 2.1% of the population [11].

This function has changed the management of hospitalized patients and the duties of health personnel working there.

2. The Health Organization in Veneto (Italy) during the first SARS-CoV-2 pandemic wave

Friday 21 February 2020 is a central date for the Italian situation linked to the new coronavirus (date of the first death from COVID in Italy, in Vò Euganeo in Veneto).

On that date, several cases of coronavirus emerged in Lombardy: these were people from outside China, a new outbreak whose extent was not yet known. Some of the affected villages (Codogno, Castiglione d'Adda, Casalpusterlengo and others) were in fact closed, a bit like it is now for Italian "protected areas". Outside China, the number of infected people is very high in Italy, Iran and South Korea, even if for the WHO, COVID-19 is not yet a pandemic. However, between the end of February and the first days of March 2020, after Italy, an increasing number of cases and an epidemic were also detected in other states (Europe and beyond). 4, 8 and 9 March: the three key dates of the measures in Italy. The infection spread in our country, especially in the north, but it was also starting in other regions. For this reason, on Wednesday 4 March the government gave the green light for the closure of schools and universities throughout Italy until 15 March. As of the 4th, according to data from the Civil Protection, the positives were about 2700 and there were already some cases (dozens or a few) in all regions. While on Sunday 8 March came the decree that provided for the isolation of Lombardy, by far the most affected, and of other 14 provinces, which became the "red zone". Although the still unofficial draft of the decree had already been published by some newspapers on the evening of the 7th. Finally, we arrive at the last (for now) important date for Italy: that of Monday 9 March. On that day, the government extended the measures already taken for Lombardy and the other 14 provinces to the whole country, so much so that all of Italy became a "protected area". The new rules were contained in the new decree Dpcm March 9, 2020, which came into force on 10 March. In fact, the rule is contained in the hashtag #iorestoacasa, you could only go out for proven reasons of necessity such as shopping, for work needs, for the purchase of medicines or other health reasons.

On 11 March 2020, Tedros Adhanom Ghebreyesus, World Health Organization (WHO) Director General, announced in the briefing from Geneva on the coronavirus epidemic that COVID-19 "can be characterized as a pandemic situation". The WHO's goal is to appeal to all nations to counter the spread of COVID-19. This condition remained valid until the gradual recovery with Phase 2 of the pandemic crisis.

The "Regional guidelines for the reopening of health activities - Phase 2 COVID 19 - interim document" of 28/04/2020, provided specific indications on the operation and organization of hospitals in Veneto, guided by criteria for maximum risk containment of the SARS-CoV-2 infection and to guarantee safe treatments to patients who have it, which can only be provided in this context, as well as to protect the health personnel who work there. In particular, it indicated the aspects of hospital management in Phase 2 COVID-19.

The main mission of the hospital, as a technical-functional structure dedicated to the treatment of acute and immediate post-acute conditions, is to provide appropriate, timely and excellent health services, emergency/urgent health services and highly complex programmed services, aimed at patients with a high level of vulnerability, also due to infectious diseases. It follows that, among the different types of health facilities, the hospital is the one at the greatest risk of transmission of pathogenic microorganisms, due to the number of users, the permanence of many of them in the wards, invasive procedures and diagnostic-therapeutic treatments to which they are subjected and the immunosuppressive state of many of them. The eventuality that epidemic clusters may arise within hospitals entails such serious consequences that it is essential to implement all the necessary measures to prevent their occurrence. Therefore, the hospitals of the Veneto Region should have permanently adopted access procedures in compliance with the guidelines contained in this document

which represented, for the hospitals, a tool to be used, not only in this epidemic phase, to prepare specific operational processes and paths of access but also aimed at the prevention and management of infections from different pathogens. This task was carried out by the Medical Departments of the Presidium which, for this purpose, would have collaborated with the corporate Risk Management Services.

This document, therefore, had the purpose of:

- returning the hospital to its main management function emergency/urgency and health services based on the provisions of the “Hub and Spoke” model, reaffirmed within the Veneto Regional Social-Health Plan of 2019–2023;
- reducing all the low-complexity functions that can be performed in other health facilities, in order to drastically reduce the flows of users who access them, with a view to preventing infectious diseases with particular reference to SARS-CoV-2 infection;
- further strengthening the pathways aimed at containing hospital infections, with particular reference to SARS-CoV-2, for patients, in particular the most fragile ones, who need treatment for other pathologies;
- ensuring the safety of personnel working within hospitals.

This document was aimed at all regional health authorities and accredited public and private hospitals, in order to provide the necessary and appropriate directives with respect to the access of hospitals to:

- the users/patients who came for treatment.
- the health, technical and administrative personnel operating there.
- the staff of external companies that provided services to the hospital (cleaners, employees of service cooperatives, etc.)
- workers in internal utility services.
- visitors.
- providers.
- volunteers.

This document was divided into the following operational lines:

1. General criteria for user access to hospital facilities.
2. Criteria for access to the emergency room.
3. Criteria for managing admissions activities.
4. Criteria for carrying out the surgical activity.

5. Criteria for carrying out outpatient activities.
6. Healthcare services in private practice.
7. Internal support services.
8. Relations with users.
9. Rules for employees.
10. Personnel related to service, work and supply companies.
11. Hygiene of the environments.
12. Morgue.

The general criteria for user access to hospital facilities are divided into prevention and compartmentalization measures for the containment/zeroing of the risk of contagion and can only be obtained by rethinking and radically redefining the organizational and care processes, the operational and connection spaces and separation of the different activities that take place within the hospital. The principle must be emphasized that every access to the hospital must have an adequate reason and, outside of urgent/emergency situations, it must, as a rule, be booked. The fronts to consider in defining these measures are:

- the methods of access for people to the health facility, depending on the purpose, the activities/services to be used and their conditions at the time of access;
- the precautionary, preventive and protective measures of the various subjects;
- the definition of suitable routes to convey, as neatly as possible, the flows of people, separating, as far as possible, the areas and routes for admissions, clinics and services;
- the need to guarantee the safe use of health services for people who need them;
- the need to consider the logistical and organizational characteristics of each individual structure, respecting the freedom of each managerial figure to adapt the prevention and protection measures to their own contexts;
- the definition of the sanitary and hygienic measures of prevention in the environments.

In order for anyone to access the hospital in safe health and hygiene conditions, minimizing the risk of transmission of pathogenic microorganisms, it is necessary to scrupulously observe the principle that only people who must access the hospital.

- to benefit from health services such as: urgent or planned admission, PS services, outpatient services (urgent or planned) or services related to a previous admission, etc.

- take advantage of other services that cannot be provided remotely (e.g. picking up of drugs for exclusive hospital distribution, administrative services that cannot be accessed from home due to lack of IT means, etc.)
- visit a relative, assist a minor or a disabled person.
- work there, in any capacity.

This principle implies the regulation of access and the maintenance of the set of hygiene and public health measures aimed at limiting the risk of transmission of microorganisms through the circulation of people in the hospital environment; these measures include:

1. the limitation of access to cases of real need;
2. the definition of differentiated paths;
3. social distancing;
4. the prevention of transmission through droplets;
5. hand hygiene.

The application of these preventive measures was also referred to in the Ordinance of the President of the Regional Council no. 40 of 13 April 2020 and would have been maintained, in order to prevent the transmission of SARS-CoV-2 infection, even after the end of the ongoing pandemic.

3. Results

3.1 Organization of the activity in our hospital

The end of the lockdown corresponded to a gradual relaxation of the restrictive measures put in place for the purpose of the containment determined by the coronavirus pandemic SARS-CoV-2 (COVID-19), which hit the health and economic system of our country in the spring 2020 and in a particular way our Region.

This moment coincided with the start of Phase 2 of the COVID-19 which also involved the Monastier Hospital with a significant commitment of human and economic resources, in order to guarantee the status of COVID-free Hospital, already been in place since the beginning of the pandemic itself.

In fact, during Phase 1, the Hospital remained operational at all times, with a central role in the organizational and health management chessboard of the eastern Treviso area.

From the end of February 2020, the strategic management of ULSS 2 decided to confer on the Monastier Hospital on the maintenance of urgent activities in a COVID-free context (i.e. free from coronavirus), in order to guarantee all medical emergencies and surgical-orthopedic “safe treatments” to safeguard the integrity of the patient, often elderly, who was admitted and treated there.

To this end, the Nursing Home management has put in place a “very tight mesh network” of controls based on evidence and reasonableness, adapting them to the inevitable changes that medical science has brought, allowing us to move from a critical Phase 1 to the current state.

During Phase 1, the Hospital management adopted the following progressive measures to maintain the status of a COVID-free Hospital:

- It has always adapted to all national and regional regulations and standards in force.
- All the material and instrumentation (respirators, monitors, infusion pumps, etc.) of the first aid and reanimation have been sold to the intensive care unit (ICU) of the reference area hospital (hub centre of reference), in that moment in a great state of the managerial shortfall.
- Health personnel have been made available to the hub centre of reference for any needs or critical issues that cannot be overcome.
- The organization of the structure has been transformed: from a hospital with a programmed elective activity of excellence to a hospital with emergency activities (although it does not yet have its own operational emergency room), creating shifts for the availability of health personnel that has allowed hundreds of patients (especially elderly at risk) to receive urgent specialist care, keeping them “protected and safe”.

All this was possible thanks to the establishment of an Operational Crisis Unit h24 / 7on7 until the end of Phase 1.

- The staff (health and non-medical) who accessed the Nursing Home have been checked through the access gates to the Nursing Home, which allows temperature control and daily medical history of the subject who accessed the facility, producing a daily report for the purpose of epidemiological surveillance.
- All subjects with body temperatures higher than 37.5°C were entrusted to the caregiver. All patients entering the admissions regime were subjected to a throat swab for specific RNA-COVID-19 research, and COVID-19 negative patients admitted exclusively in single rooms (in the medical department, more at risk, with negative air pressure).
- All the staff operating in the Nursing Home were subjected to active surveillance in order to preserve their integrity and of the frail hospitalized patients, placing the subjects at risk in quarantine until their negativity to the tampon and subsequent serological tests were determined qualitatively.
- The use of PPE has been arranged systematically to healthcare personnel and patients, in order to ensure safety towards potentially infected patients and fragile subjects who are certainly not infected and the healthcare staff themselves.
- In all cases of admission, a device (tablet for video calls) has been made available to the patient during the hospital stay for communication with the family, preventing access to accompanying persons/relatives (except in special cases).

- Social distancing measures have been guaranteed at the time of access, during waiting, in the departments and admission areas.
- Antibody screening has been done with the qualitative determination of COVID-19-specific antibodies (IgM and IgG) in subjects (patients or staff) with clinical doubt when these procedures have become accessible and reliable.

3.2 COVID-free hospital organization

Phase 2, therefore, began after having guaranteed the status of COVID-free Hospital to the Monastier Hospital and the safety of the subjects who up to now have passed through it.

In this new phase, the difficulty in eliminating the risk of contagion (which, however, will increase) has led to further restrictive decisions, in order to maintain a closer and therefore more effective control network.

The management of the Nursing Home has therefore decided to create a “lean” structure to direct these operations coordinated by a COVID manager.

This structure will make use of all the best technical-scientific and specialist skills in order to further safeguard the integrity of the Hospital’s COVID-free status and to make access to it still safe for patients, staff (and therefore their families) and all those who want to take advantage of the excellences that are available to a territory and a population that at this moment needs “Safe Care”.

To this end, it was decided to reorganize the resumption of services as follows:

- Arrangement of 5 filter zones for the entrance to the Nursing Home (**Table 1**).
- Arrangement of 5 gates in the filter areas equipped with turnstiles to determine the access flows of subjects to the Nursing Home (**Table 2**).
- Arrangement of four check-in areas for patient registration.
- Preparation of routes for patients who must access treatments and clinics by appointment (**Tables 3, 4, 6–9, 11–13**).

A (WHITE)	Access for patients destined for outpatient clinics, cardiology, admission, symptomatic patients, patients in an ambulance, others	Tensile structure in front of the entrance above the access ramp to the Nursing Home
B (BLUE)	Access for patients destined for pre-admission, dentistry, post-operative check-up, swabs	External entrance to the ambulatory-cardiology reception area
C (YELLOW)	Access for patients destined for physiotherapy	External entrance to the physiotherapy reception area
D (NO COLOR)	Access for employees, specialists, suppliers, technicians or others	Rear access tunnel
E (RED)	Access to laboratory, radiology, handicapped people, minors	Hot room of the accident and emergency department
F (BLACK)	COVID Point	Tensile structure for tampons

Table 1.
Filter areas A-B-C-D-E.

Waiting room with entrance gate
Seats with a minimum distance of one and a half metres
Turnstiles with fever measurement and PPE control
Entrance gates and infrared thermo-scanner
Diversified path for symptomatic or febrile (sub-febrile) patients through filter area A
Check-in for booked patients
It is desirable to reach 100% of online or telephone bookings (CUP) as soon as possible
Check-in for unbooked patients (It is desirable to reach 0% of accesses without booking as soon as possible)
Presence of a room assistant
Water-drink-coffee dispenser
Mask and gloves dispenser

Table 2.
Gate features.

Seats with a minimum distance of 1-m
Certain tensile structure at Gate A, no tensile structure at Gate B, no tensile structure at Gate C, tunnel already present at Gate D, hot room of the accident and emergency department already present at Gate E
Summer air conditioning with a negative air pressure circuit in the tensile structure or natural air recycling
Doors/windows that can be opened to allow air to be recycled in the tensile structure or in the waiting rooms
Seating with fixed chairs spaced one and a half metres apart
Monitor skip queue (Filter Zone B-C)
TV monitor (Zone B-C)
Totem for booking at Gates A and B
Disinfectant dispenser
The turnstiles with fever measurement and device control allow control of access and exit flows (with data centralization and remote access control) for patient access at presentation time with a thermo-scanner and alarm if: <ul style="list-style-type: none"> • $TC \geq 37^{\circ}C$ • no PPE (Mask)

Table 3.
Management of outpatient areas – waiting room with entrance gate.

If the patient is febrile ($TC \geq 37.5^{\circ}C$), he/she is sent to the entrance to the Emergency Department (ramp side) upon communication of the room assistant from the Gate sending the room assistant of Gate E
If a patient with $37^{\circ}C \leq TC < 37.5^{\circ}C$, re-evaluation of the temperature by the Room Assistant with the tympanic or axillary thermometer. If confirmed, sent as in the previous point
If a patient is without PPE (mask and gloves), he/she is asked to purchase them
The Room Assistant must provide for patients who are unable to purchase surgical masks and gloves
The patient must enter and exit (if possible) the Nursing Home through the same turnstile

Each turnstile must be “controlled and governed” by the Room Assistant
The Room Assistants must be equipped with manual thermo-scanners (even in the case of turnstiles with thermo-scanners)
The filter area E can be controlled by a volumetric thermo-scanner
Infrared thermo-scanners are turnstile devices
The temperature check is guaranteed by the Room Assistant
The Gate and waiting area for symptomatic or febrile (sub-febrile) patients are located in the waiting room of the emergency department

Table 4.
Various events.

If the reason for accessing the Nursing Home is the symptom or fever he/she presents, the procedure already established at the time of booking will be followed
If the reason for access is different and there is no urgent need for access to the Nursing Home, he/she will be sent to the care provider for territorial care
If the reason for access is different and there is an urgent need for access to the Nursing Home, the referral specialist will be contacted
If the referral specialist is not reachable or is unable to define the problem or urgent management, the patient will be placed in safety and sent to the referral emergency room with 118
If the symptomatic or febrile (sub-febrile) subject is the carer, he/she will be sent to the care provider for territorial care
Surveillance protocol applications already in place

Table 5.
Diversified path for symptomatic or febrile (sub-febrile) patient through Gate A – the symptomatic or febrile (sub-febrile) patient, sent to the waiting room of the emergency department, is taken in charge by the assistant of Gate E and accommodated there.

The booking is made via CUP or online
The booking must be detailed and also include an information check (no interview) of the patient’s health status (information report attached to the booking)
The patient must be present in the Filter Zone indicated 20 minutes before the time indicated for the visit
The passage from the turnstile to go to check-in: Gate A - Central Cashier Area Gate E - Central Cashier Area, Emergency Triage, Radiology Cashier area Gate B - Outpatient Reception Area Gate C - Physiotherapy Reception Area
The arrival of the patient at the outpatient clinic dedicated to the time of examination
Check-in filter totem at Gate A-B

Table 6.
Check-in for booked patients - it is desirable to reach 100% of online or telephone bookings as soon as possible.

Such patients should be referred to Gate A
Non-booked patients must ask the Room Assistant for a manual booking
These patients will be able to book their examination by entering with a report, one for every five patients already booked (1/5) at check-in

Table 7.
Check-in for non-booked patients – it is desirable to reach 0% of accesses without booking as soon as possible.

The presence of a Room Assistant is foreseen, positioned at each gate
This person will refer to the user
He/she will act as an intermediary with the check-in
He/she will control the body temperature or provide PPE if not available
He/she (at Gate A-E) will be the liaison with the switchboard for the search for the specialist
He/she (at Gate A) must deliver the information form for registration at check-in to patients who show up without registration
He/she will verify the regularity of the procedures, will give information on the path to follow, will verify that all the safety protocols are adopted: maintaining distance between people, correct use of PPE, avoiding assemblies
He/she will have to use gentle, appropriate manners, avoiding any conflicts that can arise in waiting situations
He/she will end his/her function with the Gate closed
He/she will write a report of the most significant events that emerged during his/her function

Table 8.
Presence of a waiting room.

Patients (and carers) who will pass through filter zones A and B can access the parking in front of the Nursing Home (PARK A-B)
Patients (and carers) who cross the filter area C can access the rear parking (access to physiotherapy) at the Nursing Home (PARK C)
Patients (and carers) who will cross the filter area E can access the rear-lateral parking (after the roundabout) at the Nursing Home (PARK E).
At the rear and side parking (after the roundabout) at the Nursing Home (PARK D) all the personnel (medical, technical and support) will be able to access the filter area D

Table 9.
Parking - the distribution and indications for the parking areas will be given by the civil protection volunteers.

This paper information form will be delivered to the patient who shows up without a booking and delivered to the assistant in Gate A (who will access him with a 1/5 ratio)
Questions to ask when booking: <ul style="list-style-type: none"> • Name • Surname • Date of birth • Address • Telephone number • Name and surname of accompanying person (only 1 per patient) • Reason for booking

-
- Access gate
 - Presentation day
 - Presentation at the Filter Area 20 minutes before the time of the examination (with absolute prohibition to arrive earlier)
 - Time of examination
 - Inform the patient about the path to follow
 - Exit after max 15 minutes of the end of the procedure
 - Exit from the access gate
 - Fever
 - Symptoms (cough, rhinitis or respiratory symptoms, pharyngitis, diarrhea, anosmia, other)
 - Quarantine
 - Previous contagion and / or positivity to COVID-19
 - Call booking number if 15-16-17-18 on the day of the booking
 - For those accompanying: if 15-16-17-18 on the day of booking, it is useful to change the accompanying person
 - Carry masks (surgical or other valveless) and vinyl / latex gloves
 - Front Park (Park A-B) for Gate A-B - Rear Park (Park C-E) for Gate C-E
 - Inform about probable delays due to checks and filter
 - Inform if handicapped or non-self-sufficient people (input Filter Zone E)
 - Inform if a minor (Filter E Zone input)
-

Table 10.

Booking information form - it is desirable to reach 100% of online or telephone bookings as soon as possible.

After check-in, the patient must follow the path indicated at the time of booking and confirmed at check-in
The patient will arrive at the waiting room at the appointed time and he/she will receive the examination or service booked
Along the routes there will be stewards/hostesses who will check the regularity of the procedures, give information on the path to follow and verify that all safety protocols are adopted (maintaining distance between people, correct use of PPE also by personnel, avoiding assemblies)
Once the examination has been completed, the patient can go to the cashier, the bar and try to limit the stay in the Nursing Home to a maximum of 15 minutes
elf-sufficient patients must have individual access to the visiting areas
In any case, the access of a companion of non-self-sufficient patients or minors is allowed
The exit from the facility will take place through the entry gate (if possible)
Surveillance protocol application already in place
In the clinic, the operator must present himself with the following PPE: <ul style="list-style-type: none"> • FFP2 or FFP3 mask without valve • Vinyl or latex gloves • Overshirt if invasive maneuvers on the airways or other invasive maneuvers are foreseen: <ul style="list-style-type: none"> • Visor • Shoe covers • Change of PPE after each patient with these characteristics

Table 11.

Outpatient clinics – service areas to be provided.

After check-in, the patient must follow the path indicated in the instructions given for admission and confirmed at check-in
The patient will arrive at the waiting room of the reference ward at the established time where he/she will prepare for admission

In this circumstance, the temperature will be re-measured and the Head of the Department informed by the reception nurse
Along the routes there will be stewards/hostesses who will verify the regularity of the procedures, give information on the path to follow and verify that all safety protocols are adopted (maintaining distance between people, correct use of PPE also by personnel, avoiding assemblies)
Self-sufficient patients will have to access the admission areas individually
In any case, the access of a companion of non-self-sufficient patients or minors is allowed
In all cases, a device (tablet for video calls) will be made available during the hospital stay for communication with the family
Surveillance protocol applications already in place

Table 12.
Departments – hospital areas.

Sanitation
Basic Medical Information
External Information
IT Procedures

Table 13
Connections.

- Preparation of a path for patients who must access treatments and clinics by appointment, but with critical issues (**Table 5**).
- Preparation of a personal report during telephone booking at the CUP of the structure (**Table 10**).
- Preparation of guidelines for administrative and health care.
- Updates of the organizational status, in case the needs and/or priorities of access to treatment, should change.

The strategic combination of operating procedures (as represented by the tables) and sequencing of Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) tests have proved successful, allowing uninterrupted system operativity.

All patients admitted to our hospital (DH-DS included) will be subjected to RT-PCR tests (T0) performed the day before hospitalization at Gate F – COVID Point (7.00–9.00), in order to promptly intercept any positive cases before hospitalization. Patients will continue with molecular swabs from hospitalization, following the scheme:

- T1: at the entrance of the patient in the ward (Day Hospital – Day Surgery included).
- T2: every 48 h after T1.
- T3: in the case of active or passive surveillance.
- T4 (RAPID MOLECULAR SWAB from 2021): to patients transferred from other hospitals who have not performed the molecular swab at that site (**Table 14**).

T0	Before hospitalization
T1	At the entrance of the patient in the ward
T2	Every 48 h after T1
T3	In the case of active or passive surveillance
T4 (from 2021)	To patients transferred from other hospitals who have not performed the molecular swab at that site

Table 14.
Sequential swabs.

The surveillance with sequential molecular swabs for the health and non-health personnel operating at the facility has also made it possible to avoid the formation of clusters within the structure and propagate the infections. The temporal variability of these swabs for staff will change depending on the course of the epidemic outside the hospital and will diversify into active or passive surveillance [12, 13]. These RT-PCR tests were performed on hospital staff up to once per day.

During the First Pandemic Phase of Coronavirus in Veneto in Spring 2020, we can distinguish three periods of activity at our hospital. An initial block Phase from 22 February to 9 March, a Phase 1 (total block) from 10 March to 3 May and a Phase 2 from 4 May to today (data collection deadline 18 June 2020).

The admissions activity at our hospital was referable only to urgent patients with admissions to the Departments of Orthopedics, Physiotherapy and Medicine. The outpatient activity was only possible on patients of various specialties of an urgent nature or with priority evaluation within 7 days.

In the initial phase, 85% of outpatient visits were carried out and 98.5% of patients were seen compared to the same period in 2019, and there were 102% admissions compared to 2019.

In Phase 1, 21% of outpatient visits were made and 18% of patients were seen compared to the same period in 2019 and there were 26.4% of admissions compared to 2019.

In Phase 2, 94.7% of outpatient visits were carried out and 101.6% of patients were seen compared to the same period in 2019 and there were 81.3% of admissions compared to 2019.

During the Initial Phase and Phase 2, the recovery of activity highlighted by the numbers above led to an optimization of the Health Organization according to the still present and important external circulation of SARS-CoV-2.

All while continuing to maintain the structure of a COVID-free hospital.

4. Discussion

When community cases of COVID-19 increase:

1. Emergency departments immediately enact new pathways and protocols for triage, evaluation and admission [14].
2. Hospitals begin to assess and enhance inpatient capacity, often by opening units not traditionally used for general medical care (for example, postoperative care units) as COVID-19–designated areas [15].

3. Hospitals reduce elective surgical activity, merge specialized ICUs, and increase costs due to the need to have more staff available for the care of critical patients. The monitoring of patient flows between departments is optimized and the communication of news about patients' conditions to family members is simplified [16].

In addition to the macro-processes, the micro-processes are completely revised, involving all the Operational Units of the Hospital. New equipment such as beds and mechanical fans is provided in specific areas. PPE and reagents for laboratory tests are purchased. Medical, nursing and paramedical personnel, even newly recruited, are diverted to critical departments and trained for emergencies. Common areas such as canteen, laundry and sanitation are organized with access scheduling. Suppliers are diverted to different areas of the building. In addition, monitoring and critical patient management guidelines are introduced. [17]. Kadri and colleagues present findings from a nationally representative cohort of 144,116 hospitalized patients cared for in 558 hospitals to understand the effect of COVID-19 surges on patient outcomes. Nearly 1 in every 4 deaths and almost 6000 total deaths may have been attributable to hospital strain due to COVID-19 [18]. However, Kadri and colleagues' analyses may not capture the tightrope that many of us walk today as we balance COVID-19 and non- COVID-19 care. Shared learning platforms to understand how hospitals are managing COVID-19 care could be launched [17].

An interesting programme was the Mi-COVID-19 initiative in Michigan, where Blue Cross Blue Shield of Michigan and Blue Care Network, the Michigan Health & Hospital Association, the Society of Critical Care Medicine, and 40 hospital systems came together to improve COVID-19 care [19]. The Mi-COVID-19 initiative served as an amalgam for clinicians and hospital leaders across the state to tackle important questions ranging from therapeutic strategies and excess antibiotic use to provider wellbeing and long-term outcomes of COVID-19 survivors [20, 21].

Besides patients, there are other victims when COVID-19 strikes hospitals: health care workers. And although some have raised their voices asking for change [22], surveys suggest that many are considering leaving the field after being battered by wave after wave of COVID-19 [23].

Measures to control SARS-CoV-2 infections include active surveillance for early identification of the positive subject, with his/her isolation in dedicated rooms and the systematic use of PPE; and passive surveillance for the tracking of potential secondary cases (perhaps asymptomatic) [24–27].

Effective infection control measures against SARS in 2003 were less successful against SARS-CoV-2 [28], due to the greater number of asymptomatic (but infectious) cases, and the presence of a peak of viral load with the presentation of symptoms. Therefore, the systematic screening of patients and healthcare staff by RT-PCR reduces the risk of outbreaks in hospitals [29]. The risk of hospital transmission increases if asymptomatic COVID-19 patients are placed in non-AIRI rooms, and/or in high-flow oxygen or non-invasive ventilation [30]. Therefore, the use of PPE by healthcare personnel and inpatients should be applied to reduce the risk of SARS-CoV-2 droplet transmission [31]. Universal masking in the community also reduced the incidence of COVID-19 in the general population [32]. Also, appropriate use of PPE is associated with a decreased risk of COVID-19 [33]. The huge number of patients admitted to the COVID-19 Hospital also greatly increases the risk of expansion of the nosocomial epidemic. In China (Singapore), Hong Kong, UK, USA, temporary hospitals have been built (using tents or existing buildings such as conference

or exhibition halls) to cope with a sudden increase in COVID-19 cases [34–36]. During the SARS-CoV-2 pandemic in Italy, some hospitals became fully COVID-Hospitals, while in most others, parts of the hospital were converted or created to treat COVID-19 patients. In the latter cases, other parts of the hospital, “no-Covid-19” departments, treated COVID-negative patients. Bo et al. reported their experience within a COVID-free department, with asymptomatic patients or with negative RT-PCR tests. During the study, a proportional increase in surveillance tests against SARS-CoV-2 was adopted based on the increase in the community spread of COVID-19, together with the use of PPE. Their findings demonstrate that there is a not negligible risk of “hospital-acquired” SARS-CoV-2 infection, both for patients and hospital staff, particularly within overcrowded supposed no-COVID-19 wards [37].

In our hospital, the winning strategy was to avoid the spread of SARS-CoV-2 infection with modular surveillance models on the course of the pandemic: increased surveillance tests (RT-PCR tests) with the worsening of the pandemic curve. Also important were the systematic adoption of PPE, the use of passive surveillance tests (with contact tracing, both for patients and healthcare personnel) in the face of an alleged case of COVID-19 or contact [38] and, where possible, patient isolation and safe distancing.

5. Conclusions

During Phases 1 and 2 of the SARS-CoV-2 pandemic that struck Italy in the months from February to April 2020, the re-organization of the hospital structure with strict containment rules and surveillance with RT-PCR tests allowed it to remain a hospital free of SARS-CoV-2, with zero infections.

The admissions activity at our hospital was referable only to urgent patients with admissions to the Departments of Orthopedics, Physiotherapy and Medicine. The outpatient activity was only possible for patients with various specialties of an urgent nature or with priority evaluation within 7 days.

The subsequent pandemic waves, faced with the same methodological approach, have allowed the Giovanni XXIII Hospital to remain a COVID-free Hospital.

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Conflict of interest

The authors declare no conflict of interest.

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Author details

Marco Bassanello*, Ugo Coli, Antonio Tegon, Maria Teresa Pasqualini,
Aldo Farencena, Matteo Geretto and Maurizio D'Aquino
Casa di Cura Giovanni XXIII Monastier di Treviso, Treviso, Italy

*Address all correspondence to: bassanellomarco@hotmail.com

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References

- [1] Zhun ZD, Wang W et al. China novel Coronavirus investigating and research team. A novel coronavirus from patients with pneumonia in China. *The New England Journal of Medicine*. 2020; **382**(8):727-733
- [2] Munster VJ, Koopmans M, Van DoreMalen N, Van Riel D. A novel coronavirus emerging in China - key questions for impact assessment. *The New England Journal of Medicine*. 2020; **383**(8):692-694
- [3] Q&A on COVID-19, ecdc.europa.eu
- [4] Australian Government Department of Health, Novel Coronavirus. 2019. Available from: <https://www.health.gov.au/diseases/covid-19- COVID-19>
- [5] Jinyang G, Bing H, Jian W. COVID-19: Gastrointestinal manifestations and potential fecal-oral transmission. *Gastroenterology*. 2020;**158**(6): 1518-1519
- [6] Harapan H, Itoh N, Yufika A, Winardi W, Keam S, Te H, et al. Coronavirus disease 2019 (COVID-19): A literature review. *Journal of Infection and Public Health*. 2020;**13**(5):667-673
- [7] Expert reaction to news reports that the China coronavirus may spread before symptoms show | Science Media Center. [sciencemediacentre.org](https://www.sciencemediacentre.org). [Accessed on: February 11, 2020]
- [8] Sequence for Putting on Personal Protective Equipment (PPE). Available from: <https://www.cdc.gov>
- [9] MOH Updates on 2019 Novel Coronavirus (2019-nCoV) Local Situation www.moh.gov.sg
- [10] Bartoletti M, Azap O, Barac A, Bussini L, Ergonul O, Krause R, et al. ESCMID COVID-19 living guidelines: Drug treatment and clinical management. *Clinical Microbiology and Infection*. 2022;**28**(2):222-238
- [11] Bassanello M et al. Epidemiological study in a small rural area of Veneto (Italian region) during Sars-Cov-2 Pandemia. *Scientific Reports*. 2021;**11**: 23247
- [12] Vandenberg O, Martiny D, Rochas O, van Belkum A, Kozlakidis Z. Considerations for diagnostic COVID-19 tests. *Nature Reviews. Microbiology*. 2021;**19**(3):171-183
- [13] Lai CKC, Lam W. Laboratory testing for the diagnosis of COVID-19. *Biochemical and Biophysical Research Communications*. 2021;**538**:226-230
- [14] Whitwell K, Maynard R, Barry N, et al. Strategic planning and response to COVID-19 in a London emergency department. *Emergency Medicine Journal*. 2020;**37**:567-570
- [15] Griffin KM, Karas MG, Ivascu NS, et al. Hospital preparedness for COVID-19: A practical guide from a critical care perspective. *American Journal of Respiratory and Critical Care Medicine*. 2020;**201**:1337-1344
- [16] Chopra V, Toner E, Waldhorn R, et al. How should U.S. hospitals prepare for coronavirus disease, COVID-19. *Annals of Internal Medicine*. 2019; **2020**(172):621-622
- [17] Chopra V. When COVID-19 strikes your hospital. *Annals of Internal Medicine*. 2021;**174**(9):1319-1320
- [18] Kadri SS, Sun J, Lawandi A, et al. Association between caseload surge and COVID-19 survival in 558 U.S. hospitals.

Annals of Internal Medicine. 2021;**174**:
1240-1251

[19] University of Michigan Institute for Healthcare Policy and Innovation. COVID-19 Hospital Network Shares Key Lessons to Improve Care. 2021. Accessed at <https://ihpi.umich.edu/news/covid-19-hospital-network-shares-key-lessons-improve-care> [Accessed on: June 20, 2021]

[20] Vaughn VM, Gandhi TN, Petty LA, et al. Empiric antibacterial therapy and community-onset bacterial coinfection in patients hospitalized with coronavirus disease 2019 (COVID-19): A multi-hospital cohort study. *Clinical Infectious Diseases*. 2021;**72**:e533-e541

[21] Chopra V, Flanders SA, O'Malley M, et al. Sixty-day outcomes among patients hospitalized with COVID-19 [letter]. *Annals of Internal Medicine*. 2021;**174**: 576-578

[22] Essex R, Weldon SM. Health care worker strikes and the Covid pandemic. *The New England Journal of Medicine*. 2021;**384**:e93

[23] Delaney RK, Locke A, Pershing ML, et al. Experiences of a health system's faculty, staff, and trainees' career development, work culture, and childcare needs during the COVID-19 pandemic. *JAMA Network Open*. 2021;**4**: e213997

[24] Cheng VCC, Wong SC, Chuang VWM, et al. Absence of nosocomial transmission of coronavirus disease 2019 (COVID-19) due to SARS-CoV-2 in the prepandemic phase in Hong Kong. *American Journal of Infection Control*. 2020;**48**:890-896

[25] Cheng VCC, Wong SC, Wong SCY, et al. Directly observed hand hygiene - from healthcare workers to patients. *The*

Journal of Hospital Infection. 2019;**101**: 380-382

[26] Wong SC, AuYeung CH, Lam GK, et al. Is it possible to achieve 100 percent hand hygiene compliance during the coronavirus disease 2019 (COVID-19) pandemic? *The Journal of Hospital Infection*. 2020;**105**:779-781

[27] Cheng VCC, Wong SC, Chen JHK, et al. Escalating infection control response to the rapidly evolving epidemiology of the coronavirus disease 2019 (COVID-19) due to SARS-CoV-2 in Hong Kong. *Infection Control and Hospital Epidemiology*. 2020;**41**:493-498

[28] Cheng VC, Chan JF, To KK, et al. Clinical management and infection control of SARS: Lessons learned. *Antiviral Research*. 2013;**100**:407-419

[29] Kai K et al. Lessons learned 1 year after SARS-CoV-2 emergence leading to COVID-19 pandemic. *Emerging Microbes & Infection*. 2021;**10**:507-535

[30] Haymet A, Bassi GL, Fraser JF. Airborne spread of SARS-CoV-2 while using high-flow nasal cannula oxygen therapy: Myth or reality? *Intensive Care Medicine*. 2020;**46**:2248-2251

[31] Klompas M, Morris CA, Sinclair J, et al. Universal masking in hospitals in the covid-19 era. *The New England Journal of Medicine*. 2020;**382**:e63

[32] Cheng VC, Wong SC, Chuang VW, et al. The role of community-wide wearing of face mask for control of coronavirus disease 2019 (COVID-19) epidemic due to SARS-CoV-2. *The Journal of Infection*. 2020;**81**:107-114

[33] Liu M, Cheng SZ, Xu KW, et al. Use of personal protective equipment against coronavirus disease 2019 by healthcare professionals in Wuhan, China: Cross

sectional study. *British Medical Journal*. 2020;**369**:m2195

[34] Chen S, Zhang Z, Yang J, et al. Fangcang shelter hospitals: A novel concept for responding to public health emergencies. *Lancet*. 2020;**395**:1305-1314

[35] Wong SC, Leung M, Tong DW, et al. Infection control challenges in setting up community isolation and treatment facilities for patients with coronavirus disease 2019 (COVID-19): Implementation of directly-observed environmental disinfection. *Infection Control and Hospital Epidemiology*. 2021;**42**(9):1037-1045

[36] Chia ML, Him Chau DH, Lim KS, et al. Managing COVID-19 in a novel, rapidly deployable community isolation quarantine facility. *Annals of Internal Medicine*. 2021;**174**(2):247-251

[37] Bo M, Brunetti E, Presta R, Rota M, Dutto F, Cortese A, et al. To keep a COVID-19-free hospital ward: Mission possible? *Aging Clinical and Experimental Research*. 2020;**32**(8):1627-1628

[38] Black JRM, Bailey C, Przewrocka J, et al. COVID-19: The case for health-care worker screening to prevent hospital transmission. *Lancet*. 2020;**395**:1418-1420