

# Colorectal surgery in times of COVID-19

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## ABSTRACT

*This is attempt made to write a guide for the safe practice of the specialty in times of COVID- 19. A search was made of recent publications available in Pub-Med and another search engines, the experience of experts was used through different conferences or communications from scientific societies.*

*This pandemic has forced us to learn in a dizzying way the management of a new disease, where surgical specialists begin to learn about clinical and virologic terminology, among others completely new and unknown to most of us. We had to adapt our usual practice to the new standards, making different errors in the initial handling, caused by the lack of prior information.*

*The present guide tries to cover the topics considered most relevant at this time, such as the office management, recommendations of which pathologies are able to operate and which are not recommended. Recommendations for alternative treatments to surgery while the pandemic lasts. Diagnostic methods used to assess infection in patients who will undergo surgery, etc.*

*Links and appendices have been added for those who wish to expand on a particular topic, this prevents the guide from being more extensive and losing its practicality with which it was intended.*

*We hope this guide will serve to facilitate the understanding of this new disease and its management for any surgeon who needs to assist patients with colorectal pathology. Surely at the end of these lines there will be new evidence that must be adapted and incorporated into that currently presented.*

**Keywords:** Pandemic; COVID-19; SARS-cov-2; Colorectal Surgery

## INTRODUCTION

The need for performing a surgical procedures guideline for the practice of safe coloproctology during COVID-19 pandemic arises as a priority. Especially, at times when all or almost all routine elective surgical practice is paralyzed, not only in our country but also worldwide.

Different countries that are currently with a decreasing infection curve are beginning to publish guidelines based on their own experience and on scientific work carried out in the field in record time.

These guides such as the Chinese,<sup>1</sup> Italian,<sup>2</sup> Spanish<sup>3</sup> or English<sup>4</sup> among others,<sup>5</sup> are of great value for countries like ours where the outbreak has not yet manifested itself in its greatest expression .

## OBJECTIVE

The content of these pages is intended to serve as a guide for different specialists in the country for the safe practice of coloproctology during the COVID-19 pandemic.

## METHODS

This guideline is not based on personal experience. Up-to-date sources of information, directed at surgeons and especially at colorectal surgeons, were used.

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Since there is no firm evidence in the world, the experiences and evidence in force at the time of writing the document will be used. Due to the changing dynamics of knowledge of this new disease, it is possible that at the time of publication, new evidence will emerge that needs to be updated.

The guidelines of scientific societies such as SAGES, ASCRS, EAES, NHS, WHO, and different sources such as the COVID-textbook of China, conferences and webinars of the AIS channel, ASCRS, SAGES, EAES, etc. were used as sources of information.

A bibliographic search was carried out in PubMed, and other sources such as General Surgery News and expert experiences were used.

We will focus on developing the topics that as specialist surgeons may be of our greatest interest.

It is not the intention to cover the entire pathology since it would exceed the limits of our practice.

On the other hand, we will try to make international standards as real as possible for our environment, bearing in mind that supplies and resources will be different from the countries of the first world.

## DEVELOPMENT OF THE TOPIC

### 1. Management of the outpatient office:

- Scheduled consultations should be kept to a minimum to avoid the spread of cross infection, especially in the most vulnerable or fragile population.
- A telephone triage system must be established prior

to awarding the appointment and another on-site.

- Both patient and doctor should wear face masks throughout the consultation.
- Appointments should be spaced as much as possible.
- Contact surfaces such as desks, computer keyboards, etc. should be sanitized between patients. (see Appendix a).
- Give priority to care for patients with suspected or confirmed oncological pathology.
- All routine visits that require a physical examination or invasive maneuvers should be postponed.
- If the institution or the professional have the possibility of making an online or telephone consultation, it can be offered as a possibility. Most payers are accepting this modality and contracts can be generated with different providers for this purpose.

## 2. Management of surgeries during the pandemic

### *Oncological surgery*<sup>5-9</sup>

- Avoid scheduled consultation for oncological follow-up, except in cases of high suspicion of disease progression.
- Consider telephone tracking.
- In patients with a high risk of COVID-19 morbidity and mortality (elderly, persons with respiratory pathology, frail, etc.), alternatives to surgery should be offered.
- Make a risk/benefit balance between the surgery to be performed and the possibility of complications that prolong hospitalization. In this sense, it is recommended to postpone all major oncological surgeries, especially in fragile patients.
- Defer surgeries for malignant polyps, or early stages of the disease.
- Surgery is indicated if bowel obstruction occurs. Only in the case of an obstructive rectal tumor is an ostomy preferred, for the rest of the obstructions it is preferable performing anastomosis whenever possible. Another situation for indicating surgery is intestinal hemorrhage requiring transfusions.
- In colon cancer, proceed with surgery with curative oncological criteria.
- In rectal cancer consider starting all neoadjuvant treatment options including TNT. In colon cancer consider neoadjuvant chemotherapy in locally advanced tumors.
- Start first-line therapies in metastatic disease.
- Delay therapies beyond first-line therapies, especially those of little proven efficacy.
- In rectal cancer after neoadjuvant and/or TNT, postpone surgery 12 to 16 weeks.
- Use 5x5 Gy of pelvic radiotherapy and delay surgery

in locally advanced rectal cancer.

- It is advisable to divide hospital action policies into phases. This allows rationing of resources and identification of the phase each center is in according to its occupancy of beds by COVID-19 patients and the resources available both in terms of personnel and equipment. In this way, the action must be changing from minor to major. The fewer COVID-19 patients the hospital has and the more balanced its resources are, certain surgeries or procedures may be performed, which will be suspended and modified when beds and resources are scarce. See ACS link <https://www.facs.org/covid-19/clinical-guidance/elective-case/colorectal-cancer>. See EAES Link <https://academy.eaes.eu/eaes/2020/eaes-covid-19/293179/doctor.andrea.pietrabissa.and.doctor.salvador.morales.conde.eaes.html?f=menu%3D14%2Abrowse-by%3D8%2Asortby%3D2%2Amedia%3D1%2Aspeaker%3D779763>

### *Proctology (2-10)*

- All proctological procedures should be postponed until the end of the pandemic, except for anorectal urgencies.
- In emergency situations it is preferable to perform local anesthesia with sedation to avoid hospitalization of the patient. Outpatient procedures are recommended whenever possible.
- All pathology of the pelvic floor should be postponed and remote interviews can be used with any available method.

### *Inflammatory Bowel Disease (IBD) (extension of the topic in Appendix b)*

- Immunosuppressive therapies used to induce and maintain remission, and avoid IBD complications, although may increase the risk of some infections, do not show an increased risk of infection with SARS-CoV-2 or the development of COVID-19 in the treated patients.
- Most IBD patients who develop COVID-19 have a mild course and recover quickly. The groups at highest risk include those over 65 and with co-existing diseases (pulmonary, cardiac, and/or diabetes).
- Available evidence suggests that IBD patients are not at increased risk of developing COVID-19 and should continue taking their medication. The use of mesalazine should be continued as it does not increase the risk of infection.

- Corticosteroid therapy can be continued, but possible side effects should be considered. The need for corticosteroid rescue therapy or hospitalization for a relapse is never an ideal situation, especially when medical resources may be exhausted.<sup>27</sup>
- Patients receiving immunosuppressants should be carefully monitored for symptoms and/or signs suggesting Covid-19.<sup>28</sup>
- It has not been possible to establish the appropriate adjustments to those treatments to reduce the risks or complications of the disease.
- New immunosuppressive prescription or increased dose of an ongoing therapy is not recommended in epidemic areas.
- IBD patients have been recommended to follow the general public health measures described by the WHO.<sup>29</sup>
- Information and advice for IBD patients during the COVID-19 global pandemic should be under the supervision of an interdisciplinary team, if possible remotely. Keeping the disease in remission is believed to protect against COVID-19.

### **Role of endoscopy in IBD during the pandemic (enlargement in Appendix c)**

#### *During the pandemic, endoscopy should be indicated, in different scenarios<sup>22</sup>*

- Confirmation of the diagnosis in a patient with IBD, with a severe-moderate flare, since biological therapy with immunosuppressants may be indicated as early treatment.
- To establish an acute-severe outbreak in patients with confirmed ulcerative colitis (UC).
- Intestinal subocclusion secondary to colon neoplasia in patients with UC or ileocolonic anastomosis stenosis in patients with Crohn's disease for possible dilation.

### **Role of surgery in IBD**

- In the context of the COVID-19 pandemic all elective surgery must be deferred.
- Consider what is truly urgent and in absolute need of surgical intervention.<sup>2</sup>
- Team up with gastroenterologists and critical care specialists to assess and balance the risks of surgery vs. immunosuppressive treatment.
- COVID-19-free sites should preferably be used for surgical interventions in patients with IBD.
- Patients with complicated IBD should not be deferred, in terms of priority, due to limitations in the medical care resource.
- Interventional radiology and nutritional support are

essential for patients awaiting resolution.

- Take into account the scenario of postoperative complications, such as anastomotic leakage or intestinal fistulas that require rescue surgery. This will mean accepting a higher rate of open surgery and ostomies.
- Patients with perianal Crohn's disease and perianal abscesses should be offered emergency drainage.
- In the absence of clear signs of abscess, patients with pain and clinical suspicion can be treated with antibiotics, performing urgent perineal magnetic resonance imaging to exclude hidden infection that may require urgent surgical drainage.
- Perianal sepsis should be considered as a surgical emergency.
- Post pandemic, patients who would normally be recommended to undergo surgery to improve their quality of life or those on plan of bowel transit reconstruction should be prioritized.

### **Emergency surgeries**

- All patients requiring emergency surgery should be treated as COVID-19 positive until proven otherwise. It is appropriate to perform a nasal swab for PCR testing when the patient is admitted, but waiting for the result should not defer definitive surgical treatment.<sup>10</sup>
- Laparoscopy should only be used if suitable equipment is available: trocars with clogging system, connected to negative pressure aspiration and sealed under water. The incisions through which they are inserted should be small to prevent air leakage. When there is hollow viscus perforation, the conventional approach is recommended.<sup>10</sup>
- According to the Spanish Association of Coloproctology, intracorporeal anastomoses should be favored to avoid contamination by faecal aerosolization.<sup>11</sup>
- The approach to perforated diverticulitis should not change, prioritizing conservative management.
- Both laparoscopic lavage and open and contained abdomen should be avoided, with definitive resolution preferred.
- Emergency sigmoidectomies should be performed via open approach and ostomy is preferred over anastomosis in these circumstances.<sup>11</sup>

### **3. Before surgery**

- Before any surgery, an extension must be made to the usual informed consent of each center, explaining that the risks of the intervention are greater in the context of the pandemic. Involving the patient

and family in decision-making process is essential.

- Preoperative traige and PCR tests should be performed whenever time permits. Emergency patients, especially those with immunosuppressants or suspected COVID-19 infection, should undergo a CT scan of the chest. This study has great diagnostic value, especially considering that the tests may be falsely negative, or not available.
- Tomographic characteristics: This is a viral disease with a very typical presentation pattern that makes it easily recognizable and distinguishable from other diseases: ground glass lung infiltrate with subpleural or nodular linear disposition, crazy paving pattern, subpleural lines with distortion of the architecture, with vascular structures of large caliber. In addition, the characteristic feature is its patchy distribution in the peripheral subpleural region and in the lower lobes, which makes it easily distinguishable from bacterial pneumonia and other viral etiologies.<sup>30</sup>

#### 4. In the operating room

##### a. Intubation risks

- Surgical personnel are exposed to transmission of COVID-19 in the form of aerosol or drops. This risk increases with procedures such as endotracheal intubation, tracheostomies, gastrointestinal endoscopies, evacuation of pneumoperitoneum and aspiration of body fluids by laparoscopy.
- Professionals who are not needed during intubation should remain out of the operating room until the necessary intubation and anesthesia protocols are completed.
- The use of operating rooms with negative pressure is recommended.

##### b. How to dress for surgery; Personal Protective Equipment (PPE)

- The use of PPE is recommended in case of infection or strong suspicion of COVID-19.
- N95 or other masks that offer a higher level of protection should be used.
- Disposable items must be disposed appropriately depending on the rules established by the local institution.
- Sanitize the hands once the mask is removed.
- Practice the dress and undress or “donning & doffing” (follow links with instructional videos) [https://www.cdc.gov/vhf/ebola/hcp/ppe-training/n95respirator\\_gown/donning\\_01.html#](https://www.cdc.gov/vhf/ebola/hcp/ppe-training/n95respirator_gown/donning_01.html#)
- Correct use of PPE (follow link) [https://docs.google.com/document/d/16uwMGAIxpYGAdPDcd\\_](https://docs.google.com/document/d/16uwMGAIxpYGAdPDcd_)

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- Faced with the possible shortage of PPE equipment, it is recommended to create protocols to preserve them. (Follow link) <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/face-masks.html>
- See Appendix d.

##### c. Other recommendations

- Minimum number of personnel needed in the operating room.
- Minimize the use of electrocautery. If it is used, continuously aspirate the smoke generated by it. Avoid advanced vascular sealants.
- Consider avoiding laparoscopy.

##### d. Post-operative/recovery

- In case of having to transport the patient with suspected or confirmed COVID-19 to an external location or the intensive care unit, it must be done with the minimum necessary personnel. They must use PPE and cannot be the same as those who participated on the surgical procedure.

##### e. Recommendations for surgeons, before and after the meeting with the patient:

- Change the clothes you bring from home and put them in a bag.
- Wear clothing provided by the hospital (i.e. scrub suit) since entering the facility.
- After the meeting with the patient, change the scrub suit. Bathing before putting on a change of clean clothes.
- Wash your hands frequently and maintain social distance.

##### f. At home - what to do to keep your family safe:

- Bear in mind that a form of contamination is through contaminated surfaces (in the hospital setting, the bank, the supermarket, when loading gasoline, etc). Therefore, it is recommended to apply hand sanitizer or gel alcohol before and after contact with them, in addition to the use of face mask.
- Clean the cell phone on a regular basis. During business hours it can be put in a zip-lock bag and used in this way.
- Change and wash clothes once you go home.
- Have minimal contact with family members and wash hands frequently.
- Use a disinfectant solution with 60% alcohol. <https://vimeo.com/399733860>

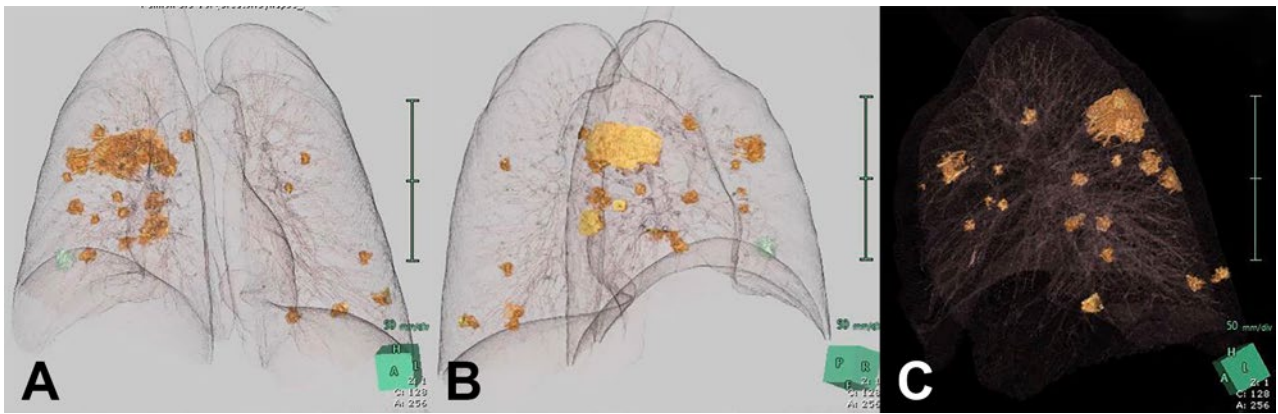


Figure 1: Tomographic images of COVID positive patient (courtesy Dr. Adriana García, Head, Diagnostic Imaging Service, British Hospital of Bs. As.)

**g. Open or laparoscopic surgery (31)**

- It is recommended to perform open surgeries to avoid the risk of air leaks or aerosolization. A review of 18 articles concludes that the evidence to prove this pathway as a possible way of spread is very low. Regardless, it remains a recommendation.
- In teams highly trained in laparoscopic surgery and with adequate systematics, this approach can be used (see emergency surgeries).
- Pneumoperitoneum should be used at the lowest possible pressure (<12 mmHg).
- Minimize the use of energy devices.
- Wear full PPE.
- Avoid laparoscopy in complex or lengthy procedures.
- Among the advantages of laparoscopy is the shorter hospitalization time and, as a consequence, less exposure of the patient and greater availability of beds.

**h. Colonoscopy. In what cases and how to prevent the spread**

- Analysis of SARS-CoV-2 in different biological samples from patients with COVID-19 has shown that up to 50% of fecal samples were positive. (23) In addition, a fifth of patients remained positive in stool tests after testing negative in respiratory samples.<sup>24</sup>
- These findings could explain why some patients with COVID-19 experience gastrointestinal symptoms (5-30%), with the possibility of fecal transmission (25) and potential risks of contamination for other patients, staff, and ourselves during endoscopy.
- ASGE and ESGE have published general guidelines for infection control during endoscopy. The systematic use of personal protective equipment (PPE) is critical.<sup>26-27</sup>

- Make sure that PPE is available and used by all members involved in endoscopy: gloves, eye protection/goggles, face masks and gowns. Cleaning and ventilation of working areas.
- Consider prolonged use or reuse of surgical masks and eye protection in accordance with hospital policies.
- The centers should strategically assign the available personnel and only those professionals trained for the evaluation should be present at the time of the study.
- The new strategies, proposed by different scientific societies, determine that screening of colorectal cancer must be suspended.
- All endoscopic procedure must be submitted to face-to-face risk stratification (fever, direct contact, COVID-19 symptoms), and PCR test (optional).
- All patients should be considered risky, taking precautions performing procedures in endoscopy rooms with negative pressure. If this is not possible, a conventional room and 1 to 3-hour ventilation and the use of HEPA filters are recommended.

**I. APPENDICES**

**a. Example of telephone and on-site triage**

Questions will be asked to evaluate if the patient had in the last days fever, respiratory symptoms, sore throat, runny nose, lack of smell or taste, or if he/she lives with someone who has these symptoms, and also if he/she or a family member returned from another country in the last 15 days.

Upon arrival at the office or medical center, the temperature should be taken digitally before admission. The previous questions should be repeated and alcohol should be applied to the patient's hands. He/she must attend with a mask. The entrance of patients should be with distance to avoid accumulating people in the waiting rooms.

## b. Digestive system and immunity in IBD

Coronaviruses bind to their target cells in the lung and digestive system through the angiotensin-converting enzyme (ACE2).<sup>12</sup>

Binding of ACE2 with the protein of the coronavirus envelope, called S, is critical in establishing infection.

ACE2 is present in the epithelial cells of the lung, intestine, kidney, and blood vessels. Its concentrations are even higher in the terminal ileum and colon.<sup>13</sup>

Two different and functional forms of ACE2 are distinguished. Full-length ACE2 with an extracellular domain, which acts as a receptor for the SARS-CoV-2 protein (S). Activation of this isoform generates an inflammatory and pro-fibrotic response with tissue damage mediated by T cells, monocytes, and neutrophils.<sup>14</sup> In contrast, the soluble form of ACE2 lacks membrane anchorage and circulates in small amounts in the blood. In vitro studies have shown that this isoform could act as a competitive interceptor (virus hijacking) of SARS-CoV-2 by preventing the binding of the viral particle to full-length ACE2. This isoform would act as an anti-inflammatory pathway, protecting the tissue.<sup>15</sup>

ACE2 expression increases in the inflamed intestine of patients with IBD.

This is demonstrated by studying tissue from IBD patients, revealing significantly higher expression of ACE2 in Crohn's disease than in UC.<sup>16</sup>

These observations suggest that the inflamed intestine of IBD patients represents an optimal door through which the virus enters human tissues. However, there is no evidence to suggest that COVID-19 occurs more frequently in patients with IBD than in the general population.<sup>16-17</sup>

Notably, the level of soluble ACE2 is increased in the peripheral blood of patients with IBD, increasing the possibility that this isoform may contribute to limiting CoV-2 infection.

Suppressing the inflammatory response in IBD is beneficial to buffer mucosal inflammation and to prevent pneumonia caused by COVID-19, according to different studies. The documented cytokine profile in patients with severe COVID-19 resembles that seen in the inflamed intestine of patients with IBD and "cytokine storm" syndrome, a condition characterized by hyperactivation of T cells and massive production of interleukin. IL -2, IL-6, tumor necrosis factor and interferon- $\gamma$ .<sup>18</sup>

Consistently, IL-6 blockers have been successfully used in pathologies characterized by "cytokine storm syndrome", and preliminary studies support the use of these antagonists in the treatment of pneumonia caused by COVID-19.

## c. Strategic post-pandemic endoscopy plan diagram for LES, categorizing cases into three groups:

*Immediate situations, when leaving the peak of the pandemic:*

- Patients with mild-moderate flare confirmed by fecal calprotectin and blood tests (increased C-reactive protein, leukocytosis, anemia)
- Patients with symptoms of mild subacute obstruction, at high risk of cancer, with imaging studies demonstrating caliber changes (CT - MRI)
- Patients with long-standing IBD under surveillance for colorectal cancer, with the presence of dysplasia on previous colonoscopy.
- Endoscopic resection of lesions with high and low-grade dysplasia of the colon already detected in a previous colonoscopy.
- New diagnosis of IBD in patients with abnormal fecal calprotectin and blood tests that suggest mild to moderate inflammation.
- Surveillance to prevent or detect postoperative recurrence within one year after surgery with normal fecal calprotectin values.
- Endoscopy after 6 months of biological therapy in symptomatic patients.

*Average situations (from 3 to 6 months)*

- Surveillance to prevent or detect postoperative recurrence after surgery if the patient has fecal calprotectin and normal blood test results.
- New diagnosis of IBD with fecal calprotectin and blood test results suggesting mild inflammation.
- Endoscopy after 6 months of biological therapy in asymptomatic patients with normal fecal calprotectin and blood tests, to verify the healing of the mucosa.
- Mild pouchitis.

*Remote situations (after 6 months)*

- Patients in remission, confirmed by the most recent endoscopy and with normal blood tests and fecal calprotectin, to decide whether to continue with biologics (since residual inflammation of the mucosa could cause a relapse shortly after discontinuation of biologic agents).
- Patients with an unconfirmed outbreak due to fecal calprotectin and results of blood tests.
- Long-term IBD patients undergoing colorectal cancer surveillance if they had not had dysplasia, stenosis, polyps, or histological inflammation in the two previous colonoscopies and in the absence of other risk factors.

**d. Sequence for the placement of personal protection elements in the care of patients with suspected or confirmed COVID-19.**

**1. PUT ON DISPOSABLE BOOTS**

Put them on covering the shoes.  
In case of not having closed and washable footwear.



**2. PERFORM HAND HYGIENE**



**3. WEAR THE GOWN:**

- Wear the gown from the chest to the back so that it covers the entire torso, from the neck to the knees, and the arms to the wrist.
- Tie it from behind at neck and waist height.



**4. PUT ON THE HIGH EFFICIENCY MASK:**

- Secure the straps or elastic bands to the middle of the head and neck.
- Tighten the flexible band around the bridge of your nose.
- Arrange the surgical mask so that it covers the nose and mouth, below the chin
- Check the surgical mask fit.



If you are going to perform a procedure that generates aerosols, also put on a triple layer mask (N95).

**5. PUT ON GOGGLES OR FACE SHIELD:**

- Place it on your face and eyes and adjust it.

REMEMBER! If you use a face shield, the use of surgical mask is not necessary for the protection of the N95, nor the use of goggles.



**6. PUT ON DISPOSABLE CAP**



**7. PERFORM HAND HYGIENE**



**8. PUT ON DISPOSABLE GLOVES**

- Extend the gloves to cover the cuff of the gown.



**Secuencia para retiro de elementos de protección personal en la atención de pacientes con sospecha o confirmación de COVID-19**

**1. REMOVE DISPOSABLE BOOTS**

- If you wear disposable boots, remove them with gloves still on. Discard it in the red waste container.



**2. REMOVE DISPOSABLE GLOVES**

- The outside of the gloves is contaminated!
- Grasp the outside of the glove with the opposite hand that you still have the glove on, and remove it.
- Hold the glove that was removed with your gloved hand.
- Slide the fingers off your ungloved hand under the other glove that has not yet been removed at wrist level.
- Take off the glove so that it ends up covering the first glove.
- Throw the gloves in the red waste container.



**3. PERFORM HAND HYGIENE**



**4. REMOVE DISPOSABLE GOWN**

- The front of the gown and the sleeves are contaminated!
- Untie the straps.
- Touching only the inside of the gown, remove it above the neck and shoulders from the inside.
- Fold it from the inside, so that the contaminated outside is inside.
- Discard it in the red waste container.



**5. TAKE OFF THE DISPOSABLE CAP**

- If you have worn a cap, remove it now (from the back of the head, touching it externally).
- Discard it in the red waste container.



**6. PERFORM HAND HYGIENE**



**Exit the room and head to the dirty area to continue the sequence of removal of the remaining PPE (goggles and mask).**

Sequence of withdrawal of personal protection elements in the care of patients with suspected or confirmed COVID-19

## Fuera de la unidad del paciente en el área sucia

### 7. REMOVE ANTI-GLOVES OR FACE MASK

The outside of the goggles or face shield is contaminated

- To remove them, put on gloves, take them by the part of the head band or the pieces of the ears
- Place them in the designated container for reprocessing materials.
- Clean it.

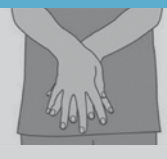
Cleaning the goggles:

1. Soak a paper towel with Surfasafe Premium® and distribute the product evenly on the outer surface of the goggle.
2. With a second towel soaked with Surfasafe Premium®, clean the inside of the goggle again, finishing on the outside.

Let the product work for 2 minutes.

Important! Do not spray the product directly on the goggle.

### 8. PERFORM HAND HYGIENE



### 9. MASK

The front part of the mask is contaminated.

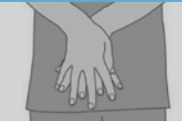
DO NOT TOUCH IT!

Remove the lower strap, then the upper one and finally remove the mask.

- If you have used the triple layer mask, discard it in the red waste container.
- Once removed, the N95 mask is stored until its next use in a clean and breathable paper bag or, failing that, wrapped in a paper towel.



### 10. PERFORM HAND HYGIENE



Source:

- Organización Panamericana de la Salud, Colocación de Elementos de protección personal. <https://www.who.int/csr/resources/publications/epp-oms.pdf?ua=1>
- Ministerio de Salud Cuidad Autónoma de Buenos Aires. Recomendaciones para el uso de los equipos de protección personal (EPP) en el escenario de un triage y en el manejo del paciente sospechoso de infección por Covid-19. <https://www.buenosaires.gov.ar/coronavirus/protocolos-coronavirus-covid-19>

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