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TRABAJO FIN DE GRADO

NURSING PROTOCOL FOR EARLY DETECTION AND PREVENTIVE ISOLATION OF TRANSMISSIBLE DISEASES IN ICU

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Abstract

Introduction

Isolation precautions are all the techniques and health care given to the infected patient and all the elements around him, as to protect him and nearby people from hospital infections.

This protocol has been elaborated with the intention of proportioning a quick, basic help while choosing isolation measures in an ICU.

Objective

The main objective, has been making a nursing isolation protocol for an Intensive Care Unit, that provides the basic information to quickly and efficiently select and put into practice the adequate, necessary isolation measures in the presence of an infectious disease, and as to prevent its contagion to the staff and to the rest of the patients.

Methods

In the elaboration of this project, it has been conducted a bibliographic review with different search tools.

The most relevant articles and Nursing Clinical Guidelines, as well as different specific isolation protocols, have been selected and used in the elaboration of this project.

Conclusions

Following the guidelines of this protocol, it is possible an early detection of patients infected with transmissible diseases based on their symptomatology, allowing to set up the adequate isolation measures for its transmission mechanism, avoiding this way the diseases' dissemination and decreasing its morbimortality and possible side effects.

Key words

Nosocomial infection, transmissible disease, Intensive Care Unit, Isolation Protocol

Resumen

Introducción

Las precauciones de aislamiento son todas las prácticas y los cuidados que se brindan al enfermo y a todos los elementos que se encuentran su alrededor, con el fin de protegerlo a él y a las demás personas de infecciones hospitalarias.

Este protocolo se ha realizado con la intención de proporcionar una ayuda rápida y básica para la elección de medidas de aislamiento en UCI, previniendo así la transmisión de las infecciones nosocomiales y sus costes asociados.

Objetivo

El objetivo principal ha sido realizar un protocolo enfermero de aislamiento para una Unidad de Cuidados Intensivos, que proporcione la información básica necesaria para, de manera rápida y eficaz, seleccionar y poner en práctica las medidas de aislamiento adecuadas y necesarias en caso de presentarse una enfermedad infecciosa y para prevenir su contagio al personal y al resto de pacientes.

Metodología

Para la realización de este trabajo, se ha llevado a cabo una revisión bibliográfica con diferentes herramientas de búsqueda.

Los artículos y Guías Clínicas de práctica enfermera más relevantes, así como diferentes protocolos de aislamiento específicos, han sido seleccionados y empleados a la hora de realizar este trabajo.

Conclusiones

Siguiendo las pautas marcadas por este protocolo, es posible la detección precoz de los pacientes portadores de una enfermedad transmisible según su sintomatología, permitiendo establecer las medidas de aislamiento adecuadas a su mecanismo de transmisión, evitando así la diseminación de las mismas, y disminuyendo su morbimortalidad y posibles secuelas.

Palabras clave

Infección nosocomial, Enfermedades transmisibles, Unidad de Cuidados Intensivos, Medidas de aislamiento

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Introduction

The most common complication in hospitalized patients is the **nosocomial infection**. The greatest prevalence of such infections takes place in patients at the Intensive Care Units (ICU), reaching a 25%, although the number of beds does not amount even to a 10% of the total hospital beds. Infections are the most frequent adverse effect, affecting approximately 20 million patients in the United States, and causing nearly 100,000 annual deaths, with an associated cost of 50 billion American dollars each year.[11]

For an infection to be classified as nosocomial or intrahospital, it must be a transmissible infectious process manifested after the first 48 to 72 hours since the hospitalization, without it being present or in incubation period in the admission of the patient, or appearing until 72 hours after the medical clearance.[8]

The set of factors or links which intervene in the infection transmission is denominated the "Epidemiologic chain".

The Agent (first link), can be of bacterial, viral, mycotic or parasitical origin, being the first two the most prevalent.

The reservoir and the source are the second link, being the reservoir where the infectious agent is, and the source referring to the place from which it travels to the host.

The main exit doors (third link) of the infectious agent are the respiratory system, the gastrointestinal tract, skin and mucous membranes and wounds.

The transmission mechanism is the fourth link in the epidemiological chain of infection; there are several different methods to reach the portal of entry (fifth link) of a susceptible host (sixth link)

Contact transmission, whether direct or indirect, is the most important and frequent mechanism of transmission of nosocomial infections.

Droplet transmission occurs when, speaking, sneezing, coughing, and during certain techniques (aspirations, bronchoscopies, spirometries...), saliva droplets containing microorganisms generated by the infected person are propelled a short distance through the air and reach the conjunctiva, the nasal mucosa or the mouth of the host. These droplets only remain airborne for a short period of time, making a special air handling unnecessary.

Airborne transmission occurs by the inhalation of microorganisms exceeding 5μ diameter by a susceptible host. Microorganisms transmitted this way, can be dispersed by air currents. It is therefore required a special air handling and ventilation system.[5-6, 10, 17]

Depending on infection's mode of transmission, there are several methods of isolation, as well as specific materials and tools to prevent its spread.[7]

Taking into account all the links in the epidemiological chain, the literature agrees that breaking the transmission mechanism is one of the factors that most influence may have in preventing the infectious agent from reaching the susceptible host. (Appendix I)

Nosocomial infections have a significant impact on morbidity, mortality and costs to both hospitals and patients and their families. They are also considered a good indicator for clinical safety measurement, which is one of the aspects of quality patient care.[17]

In the control of nosocomial infections, several procedures are performed, such as cleaning, disinfecting and hospital sterilizing; proper use of both antiseptics and disinfectants, as well as antimicrobials; monitoring of bacterial resistance, proper waste disposal and epidemiological surveillance of these infections.

Isolation precautions are all the practices and cares given to the sick person, the environment and all the elements around the infected patient, in order to protect him and the others from intrahospital infections.

The nursing staff, given their high degree of proximity and contact with the patient, should be especially careful when interacting with him, and while conducting numerous invasive techniques.

The quality of the information on isolation measures and access to the same, is vital in any ICU, and is achieved through national programs such as "Bacteremia Zero" and "Pneumonia Zero" and isolation protocols developed by each service.

Although a protocol with characteristics similar to the following one has not been made, the effectiveness of improving the isolation methods has been demonstrated in many studies aimed at the eradication of specific infections in ICU.[1-2, 14]

The elaboration of the following protocol is intended as a quick and basic help while choosing isolation measures in ICU, thus preventing the transmission of nosocomial infections and their associated costs.[3, 8-10]

Objectives

MAIN OBJECTIVE

Performing a nurse isolation protocol for ICU, which provides the basic information needed to quickly and effectively select and implement the appropriate and necessary measures in the presence of an infectious disease and to prevent its contagion to the sanitary staff and other patients.

SPECIFIC OBJECTIVES

Identifying the most common infectious diseases present in the Intensive Care Unit's area and in the nursing staff.

Analyzing the nursing care that can be conducted in the prevention of nosocomial infections.

Describing the available isolation measures, and the situations in which each one of them is necessary.

Methods

To carry out this work, a literature review has been conducted, using the search tools Dialnet, Google Scholar, Scielo, Cuiden Plus and PubMed.

The used key words have been "Isolation", "Nosocomial infections", "Intrahospital infections", "Prevention", "Intensive Care", "Nursing" and "Nursing Guideline".

The limitation used in this search consists in the selection of information published between the years 2010 and 2015 in all cases, adding the Spanish language in Google Scholar and PubMed and limiting the search to full-text articles in Cuiden Plus.

Table 1. Search tools

DATABASE	KEY WORD	USED LIMITATION	FOUND ARTICLES	USED ARTICLES
DIALNET	"Isolation" "Intensive Care"	2010-2015	32	2
GOOGLE SCHOLAR	"Nosocomial infections" "Nursing guideline"	2010-2015 Spanish-English	166	2
	"Nursing" "Isolation" "Intensive Care"	2010-2015 Spanish-English	245	2
	"Intrahospital infections" "Nursing" "Prevention"	2005-2015 Spanish-English	624	3
SCIELO	"Isolation" "Intensive Care"	2010-2015	10	2
	"Nosocomial infections" "Nursing"	2010-2015	3	1
	"Nosocomial infections" "Prevention"	2010-2015	15	4
CUIDEN PLUS	"Nosocomial infections" "Nursing"	2010-2015 Full text	67	3
PUBMED	"Nosocomial infections" "Intensive Care"	2010-2015 Spanish-English	237	3

The most relevant articles and Nursing Clinical Guidelines have been selected and used in the elaboration of this project. It has also consulted and taken into account the "Protocol of action against suspected cases of Ebola disease (EVE)" distributed by the Ministry of Health, and the "Protocol of insulation measures and other precautions for patients with communicable diseases" of the Donostia Hospital.

Using the information found, it has been elaborated a protocol of patient isolation in Intensive Care Units, following the rules of the methodological guide for the development of evidence-based protocols, by the Department of Health and Consumer Affairs of the Government of Aragón.

Development

NURSING PROTOCOL FOR EARLY DETECTION AND PREVENTIVE ISOLATION OF TRANSMISSIBLE DISEASES IN ICU

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Conflicts of interest

The author and the tutor declare that no conflicts of interest exist.

Methods

This protocol responds to the need for a prompt and controlled decision making in a suspected case of communicable disease in an Intensive Care Unit, preventing its spread in the time waiting for a definitive diagnosis, and regulating the types of insulation depending on the transmission method of such disease.

Initially, a meeting with the supervisor of the ICU is planned, and the possibility of establishing an isolation protocol in their unit is proposed. After meeting with the supervisor, the problems or barriers that could arise in the implementation of the protocol will be debated, and once given the necessary approval, the dissemination of information through the ICU's health team is conducted.

Once all the necessary information on the protocol is spread, including the table of common symptoms and the flowchart, these will become available in the unit's control room.

The protocol shall be revised every 2 years.

Objectives

Main objective

Identifying the presence of the most common communicable diseases in the Spanish Intensive Care Units and preventing its spread to the sanitary staff and to other patients.

Specific objectives

Early detection of patients with a communicable disease according to their symptomatology.

Setting of the appropriate isolation measures based on their transmission mechanism.

Prevention of the spread of such diseases, and reduction of their morbimortality and sequelae.

Professionals to whom it is addressed

Nursing staff working in an Intensive Care Unit.

Target population

Patients admitted to an Intensive Care Unit, suffering from or at risk for communicable disease.

Activities and procedures

1. Symptomatology detection and potential disease identification

Since their admission to the ICU, patients should be subjected to a continuous symptomatic surveillance by the nursing staff. Any potentially infectious symptom detected must be reported to the attending physician and contrasted with the following table of basic symptoms of the most common communicable diseases:

Table 2. Basic symptomatology and clinical conditions

Symptoms or conditions	Potential disease	Recommended isolation
Diarrhea	Enteric pathogens	Contact
Meningitis	Meningococcus	Droplets
Rash or generalized exanthemas		
Petechial/ecchymotic and fever	Meningococcus	Droplets
Vesicular	Chickenpox	Air y Contact
Maculopapular, coryza and fever	Rubella, Measles	Air
Respiratory infections		
Cough, fever, pulmonary infiltration	Tuberculosis	Air
Persistent paroxysmal/severe cough	Whooping cough	Droplets
Sputum, fever, nausea and dyspnea	Pneumonia	Droplets
Risk of multiresistant microorganisms		
Medical history of infection/colonization by multiresistant organisms	Bacteremia	Contact
Skin/wound/urinary tract infection in an environment with presence of multiresistant organisms	Bacteremia	Contact
Patients who are roommates to other patients infected or colonized by multiresistant bacteria, for over 24-48 hours	Bacteremia	Contact
Skin/wound infection, abscess drainage cannot cover	Aureus Staphylococcus	Contact

(1, 3, 8, 17)

2. Selection and establishment of specific preventive insulation measures

Once the symptoms or conditions of the patient have been communicated to the doctor, and until a definitive diagnosis is released, a series of preventive insulation measures should be established, depending on the recommended isolation for the detected potential disease.

In case of necessity for contact isolation, the measures shall be the following:

- **Individual room.** The patient, if not already in an individual room, must be transferred to one until the diagnosis is confirmed. The door may be left open.
- **Gloves usage.** The sanitary staff must wear gloves when entering the room. They should be changed after interacting with the patient and always potentially contaminated material is handled. They will be removed before leaving the room.
- **Gown usage.** The sanitary staff must wear a gown when entering the room. It will be removed before leaving the room and before taking off the gloves, and contact with potentially contaminated elements must be avoided. (Appendix II)
- **Patient's control equipment.** Every necessary item of control equipment in the room of the patient (blood pressure cuff, stethoscope, furniture...) must be for individual use of the same, and thereof not shared with any other patients. Once its presence is no longer necessary, it should be sent back to be sterilized before using it again.
- **Hand washing.** Before leaving the room, and after removing their gloves, health workers must wash their hands with antiseptic soap or hydroalcoholic gel, and avoid contact with the patient and their immediate environment until leaving the room. (Appendix III)
- **Patient ambulation.** The patient must not leave the room or do it exceptionally and taking the appropriate precautions. (Appendix IV)

In case of necessity for droplet isolation, the measures shall be the following:

- **Individual room.** The patient, if not already in an individual room, must be transferred to one until the diagnosis is confirmed. The door may be left open.
- **Gloves and gown usage.** They should only be used when there could be contact with respiratory secretions or instruments contaminated with respiratory secretions. They must be discarded after each use and before leaving the room.

- **Mask usage.** Health workers must wear surgical masks, well-adjusted to the facial surface when they are on a meter radius or less from the patient, or in the entire room if in case of performing a technique with risk of droplet emission (nebulizations, respiratory support, aspirations, mechanical ventilation...). They must be discarded before leaving the room.
- **Hand washing.** If risk techniques are not performed and there is no contact with potentially contaminated material, it is not necessary to wear gloves, and thereof enough with a hygienic wash.
- **Patient ambulation.** Ambulation must be restricted to the necessary minimum, and when the patient leaves his room, he must wear a surgical mask at all times and until return to said room.

In case of necessity for air isolation, the measures shall be the following:

- **Individual room.** The patient, if not already in an individual room, must be transferred to one until the diagnosis is confirmed. The door must remain closed.
- **Negative pressure.** The room must have a negative pressure system, with the airflow towards the outside instead of into the corridor whenever it is possible, and with at least six cycles of air renewing per hour.
- **Gloves and gown usage.** They should only be used when there could be contact with respiratory secretions or instruments contaminated with respiratory secretions. They must be discarded after each use and before leaving the room.
- **Mask usage.** Used masks should be high efficiency ones. They are to be placed outside the room and disposed of in a closed container outside the same.
- **Hand washing.** If risk techniques are not performed and there is no contact with potentially contaminated material, it is not necessary to wear gloves, and thereof enough with a hygienic wash.
- **Contaminated items.** All the disposable material used for both patient care and health workers protection, must be removed in the room, except for the protective mask, which is to be removed out of it.
- **Patient ambulation.** Ambulation must be restricted to the necessary minimum, and when the patient leaves his room, he must wear a high efficiency mask at all times and until return to said room. [3, 7-8, 17, 21]

3. Isolation measures modification after the issue of a definitive diagnostic.

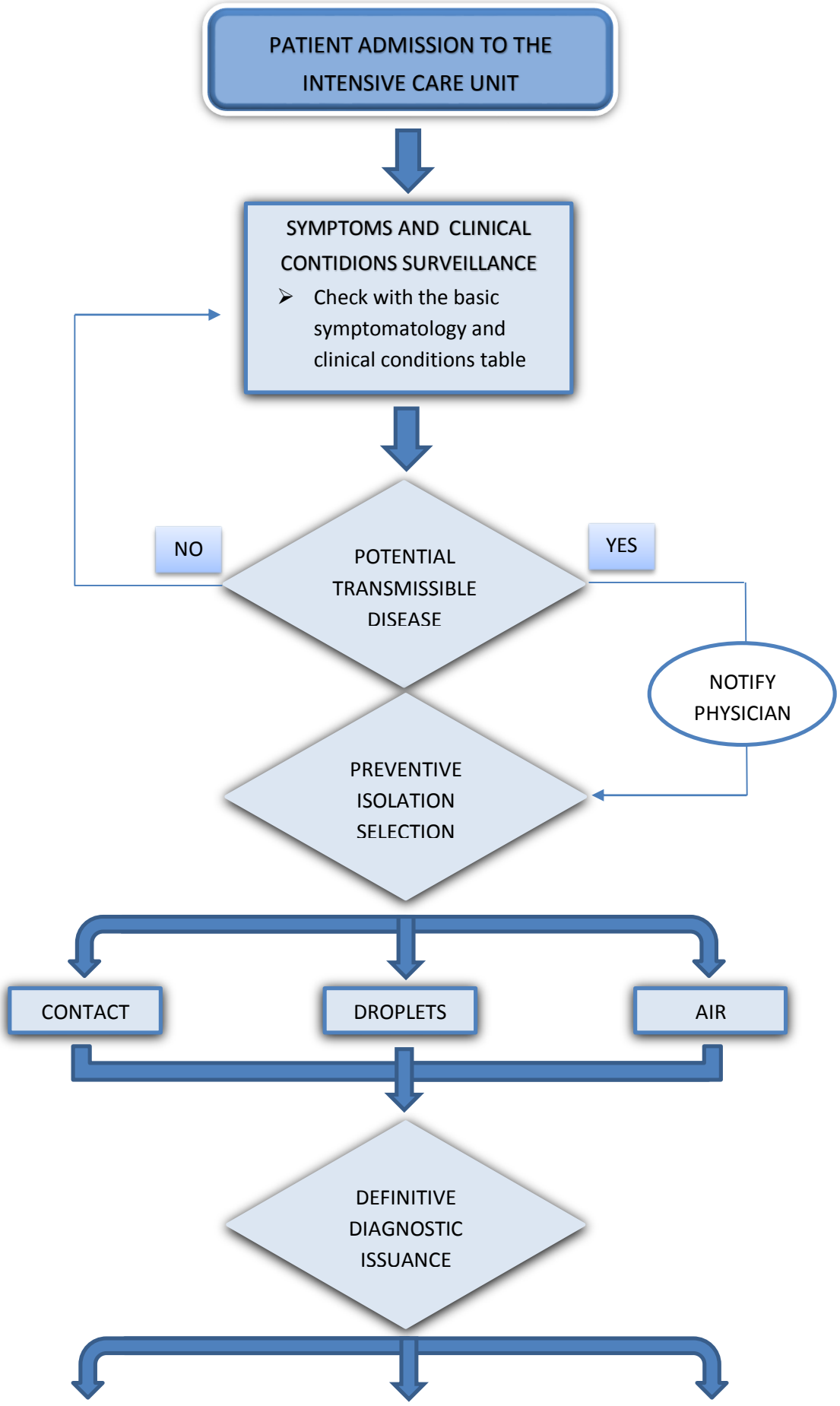
Preventive isolation measures shall remain until the issue of a definitive diagnosis. Once issued, three situations may occur:

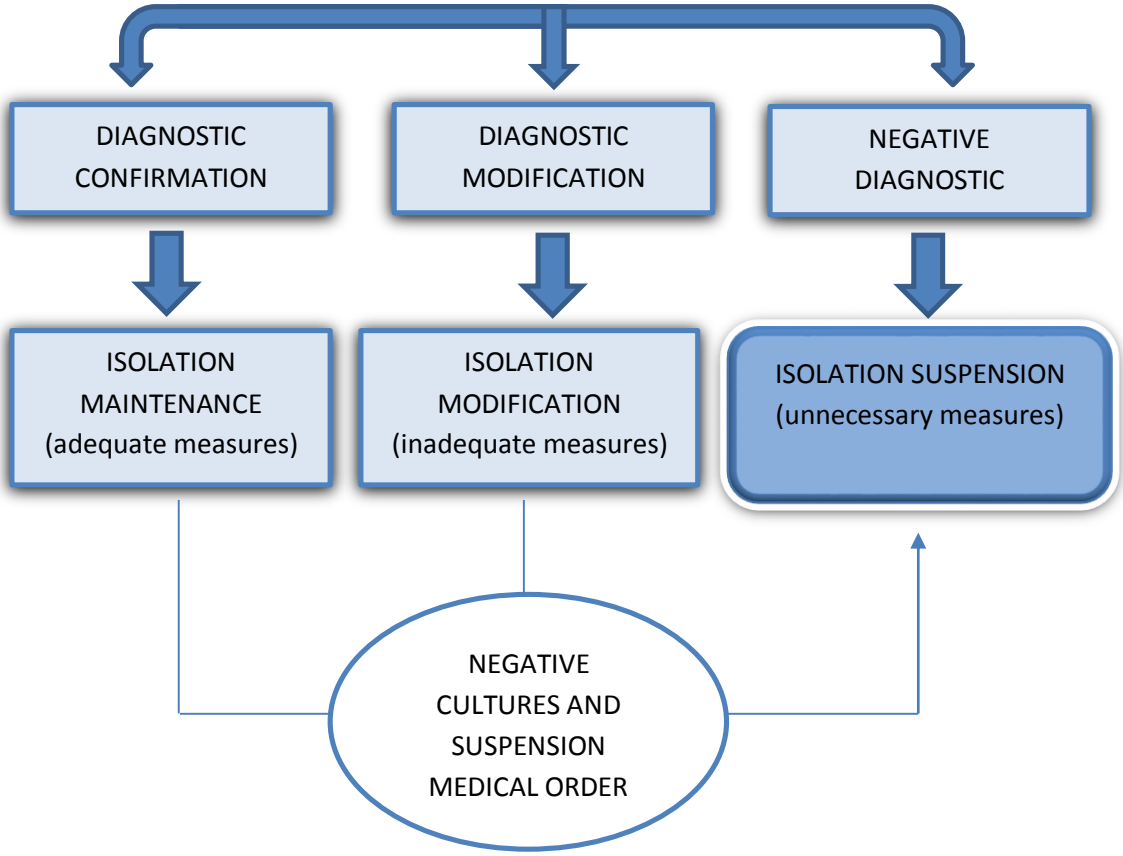
1) The anticipated communicable disease is confirmed, thus established isolation measures must be maintained.
2) The diagnosed disease is another one, with a different transmission method, in which case the isolation measures must be changed according to the new situation.
3) The diagnosis is negative for any communicable disease and so the preventive isolation measures can be removed.[17]

4. Isolation measures suspension

The suspension of the isolation measures is performed when the doctor's order to that effect is issued and once the results of the diagnostic control tests for the causal agent of the transmissible disease come out negative.[22]

Isolation algorithm




DIAGNOSTIC CONFIRMATION
DIAGNOSTIC MODIFICATION
NEGATIVE DIAGNOSTIC
ISOLATION MAINTENANCE (adequate measures)
ISOLATION MODIFICATION (inadequate measures)
ISOLATION SUSPENSION (unnecessary measures)
NEGATIVE CULTURES AND SUSPENSION MEDICAL ORDER

Evaluation indicator

Table 3. Intrahospital transmission

INTRAHOSPITAL DISEASE TRANSMISSION	
RELEVANT AREA	Intensive care unit
DIMENSION	Safety
OBJETIVE/JUSTIFICATION	The purpose of this protocol is to prevent nosocomial transmission of infectious diseases. The best method for effectiveness measurement is accounting for cases in which, having established the appropriate isolation, there has been transmission of the disease.
FORMULA	$\frac{\text{INTRAHOSPITAL DISEASE TRANSMISSION CASES}}{\text{PEOPLE EXPOSED TO INFECTED PATIENTS}} \text{X100}$
INDICATOR TYPE	Outcome
STANDAR	0%
DATA SOURCE	Clinical histories of the patients and notifications to preventive medicine
POPULATION	Patients admitted to the unit and health workers of such unit
PROCUREMENT RESPONSIBLE	Unit supervisor
PROCUREMENT FREQUENCY	Biannual
REMARKS/COMMENTS	Patients and professionals have been taken into account, as they are at the highest risk of nosocomial infection.

Glossary

- **Colonization:** presence of a microorganism on the skin or living tissue, without producing an infection or disease.
- **Contamination:** presence of living microorganisms on living or inanimate surfaces, without invasion or tissue reaction.
- **Infection:** process caused by the penetration of pathogens into the body, and their subsequent development and multiplication leading to an organic reaction**.**
- **High efficiency masks:** these masks are designed to filter particles and liquid aerosols present in the environment, preventing the user from inhaling them.
- **Multidrug-resistant microorganism:** these microorganisms show resistance to multiple classes of antibiotics, through mutations or acquisition of different resistance factors.
- **Negative pressure:** In a negative pressure room, the air flow direction is from out of the room into it. It is one of the main measures in air isolations.

Conclusions

This protocol has been elaborated responding to the need for a prompt and controlled decision making in a suspected case of communicable disease in an Intensive Care Unit, preventing its spread in the time waiting for a definitive diagnosis, and regulating the types of insulation depending on the transmission method of such disease.

By following the marked guidelines of this protocol, it is possible to detect the presence of the most common communicable diseases of the Spanish Intensive Care Units, as to prevent their contagion to the sanitary staff and to other patients.

The early detection of patients infected with a transmissible disease according to their symptomatology, allows establishing the appropriate isolation measures based on their transmission mechanism, preventing this way the spread of such diseases, and reducing their morbimortality and possible sequelae.

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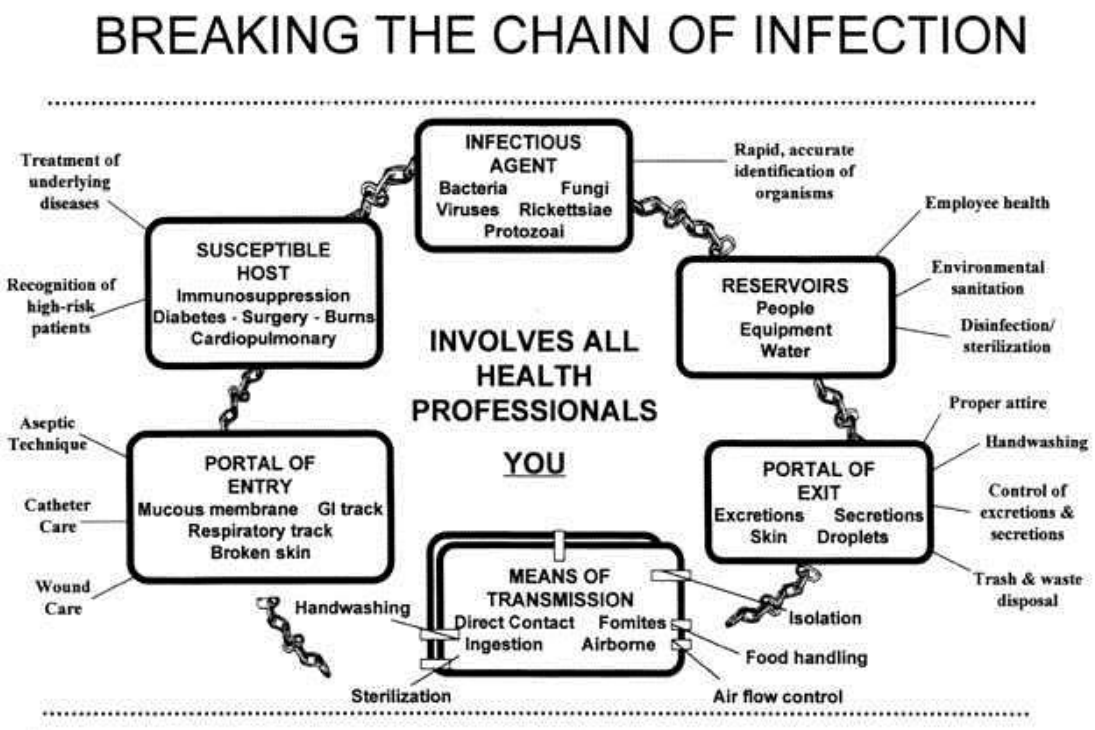
References

1. M. Morán Marmaneu, R. Tejedor López, J. Sanchís Muñoz, R. Reig Valero, R. Abizanda Campos. Contact Isolation and severe infection prevention in an Intensive Care Unit, Intensive Nursing, 2006, ISSN 1130-2399, Vol. 17, Nº. 3, pages 115-121.
2. Ricardo Bou, Sonia Gomar, Fany Hervás, Aurora Amorós, Eradication of a nosocomial infections' outbreak of Acinetobacter baumannii MDR after adjusting workloads and strengthening specific precautions, Infectious Diseases and Clinic Microbiology. 2013;31(9):584–589.
3. Ramírez Gómez, Martha Cecilia; Díaz de Correa, Yamile; Luna Villamil, Marta Alicia. The nursing professional on epidemiologic surveillance of intrahospital infections. ACOFAEN Guidelines. Lascasas Library, 2005
4. Lorenzini, Elisiane; Nunes, Gilcéia; Pagno, Roberta Soldateli; Costa, Tatiane Costa da; Silva, Eveline Franco da. Nursing and infection control in a neonatal ICU: Literature integral revision, Public Health, 2013, 9(2).
5. Morales Ortiz, Mariela Elizabeth, Lic. Herrera López, José Luis, Nursing cares and their influence on nosocomial infections presence in an ICU. Investigation Report, 2014.
6. Mtra. Gandhy Ponce Gómez, Lic. Concepción Hernández Romero, Enf. Gral, Rebeca Martínez Díaz. Hand washing and standard preventive measures performed by the health staff. University Nursing Magazine, 2010, ENEO-UNAM. Vol 5, No. 3
7. Alvarez Moreno, Carlos Arturo; Cortes, Jorge Alberto; Gómez, Carlos Hernando; Fernández, Julián Alfredo; Sossa, Mónica Patricia; Clinical Guidelines for the prevention of medical-device-associated intrahospital infections, Infectology Colombian Association, Bogotá, 2010
8. Salazar Cuba, Viviana; Nosocomial infections, Soc. Ped. Bol. Rev. 2012; 51 (3): 187–90.
9. M. Palomar, P. Rodríguez, M. Nieto and S. Sancho; Prevention of nosocomial infection in critical patients, Intensive Med. 2010; 34(8):523–533.
10. Fernandes da Silva, Ferreira; Marinho Chrizostimo, Elisabete; Lopes de Azevedo, Miriam; Ferreira de Souza, Suely; Deise de Souza et al. A challenge for the infection manager: nonadherence of nursing staff to prevention and control measures. Global Nursing, 2013, ISSN 1695-6141, Nº. 31, pages 316-329.
11. T. Lisboa and J. Rello, Prevention of nosocomial infections: strategies to improve the safety of the patients in the intensive care unit, Intensive Med. 2008;32(5):248-52
12. Izvieta Despaigne, Alba; Rodríguez Fernández, Zenén; Pascual Bestard, Manuel; Lozada Prado, Guido Alfonso and Mustelier Ferrer, Héctor Luis; Current considerations on the postoperative infections, MEDISAN 2013; 17(4): 686.
13. Ávila González, José Luis; Practical method for diagnosis and control of an outbreak of nosocomial infection at the neonatology service; Public Health Cuban Magazine, 2011;37(4):442-451.

14. Cuellar LE, Fernandez-Maldonado E, Rosenthal VD, Castaneda-Sabogal A, Rosales R, Mayorga- Espichan MJ, et al. Device-associated infection rates and mortality in intensive care units of Peruvian hospitals: findings of the International Nosocomial Infection Control Consortium. Panama Public Health Magazine. 2008;24(1):16–24.
15. Calil, Keila Cavalcanti; Valente, Geilsa Soraia; Silvino, Zenith Rosa; Actions and/or nursing interventions for the prevention of nosocomial infections in critically ill patients: an integrative review, Global Nursing 2014, ISSN 1695-6141, Nº 34, pages 406-424.
16. Alex Sánchez, María Dolores; Flores Cordón, Jaime; Nursing on the nosocomial infection prevention in ICU: Active surveillance and procedure control. Ciber-Magazine, 2013 Vol. IV. Nº 32.
17. Z. Álvarez Tuñón, P. Fernández Muñiz, M. Carmen Martínez Ortega, M. Luisa Menéndez Gutiérrez, M. Teresa Prada Roces, P. Rodríguez Rodríguez et al. Isolation guide for patients with transmissible diseases. Asturias Princedom Health Service, 2007.
18. A. Echezortu, M. Eugenia Elósegui, A. Hernando, E. Ojeda, P. Rojo, M. Angel Von Wichmann; Isolation protocol, for patients with transmissible diseases, Osakidetza's Hospital Isolation Study Group, 2013.
19. J. Lozano García, J. Mª Miró, S. Málaga Guerrero, M. Loscertales, L. Blanch, A. Iniesta Alvarez et al. Action protocol against suspected cases of Ebola disease (EVE), Spanish Health Ministry, 2014.
20. Navarra University Clinic, Prevention and control of infections, Patients Isolation Protocol, 2013.
21. J. Ramón Sáenz, M. Hortensia Esparza; Isolation measures and other precautions for patients with transmissible diseases, Osakidetza's Hospital Isolation Study Group, 2008, pages 8-18.
22. E. Larrañaga, S. Fernández; Intrahospital infection prevention Guides 2nd edition, Montevideo, 2012.

Appendix I. Links of the epidemiologic chain



Source: Nurse Instruction

Mid-State Technical College

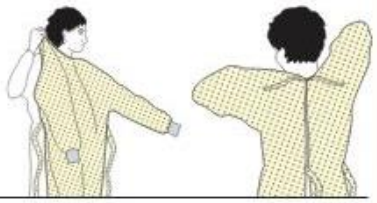
Appendix II. Sequence for putting on and removing Personal Protective Equipment (PPE)

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

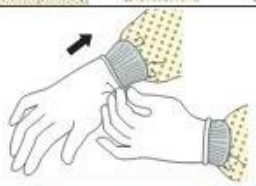
- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

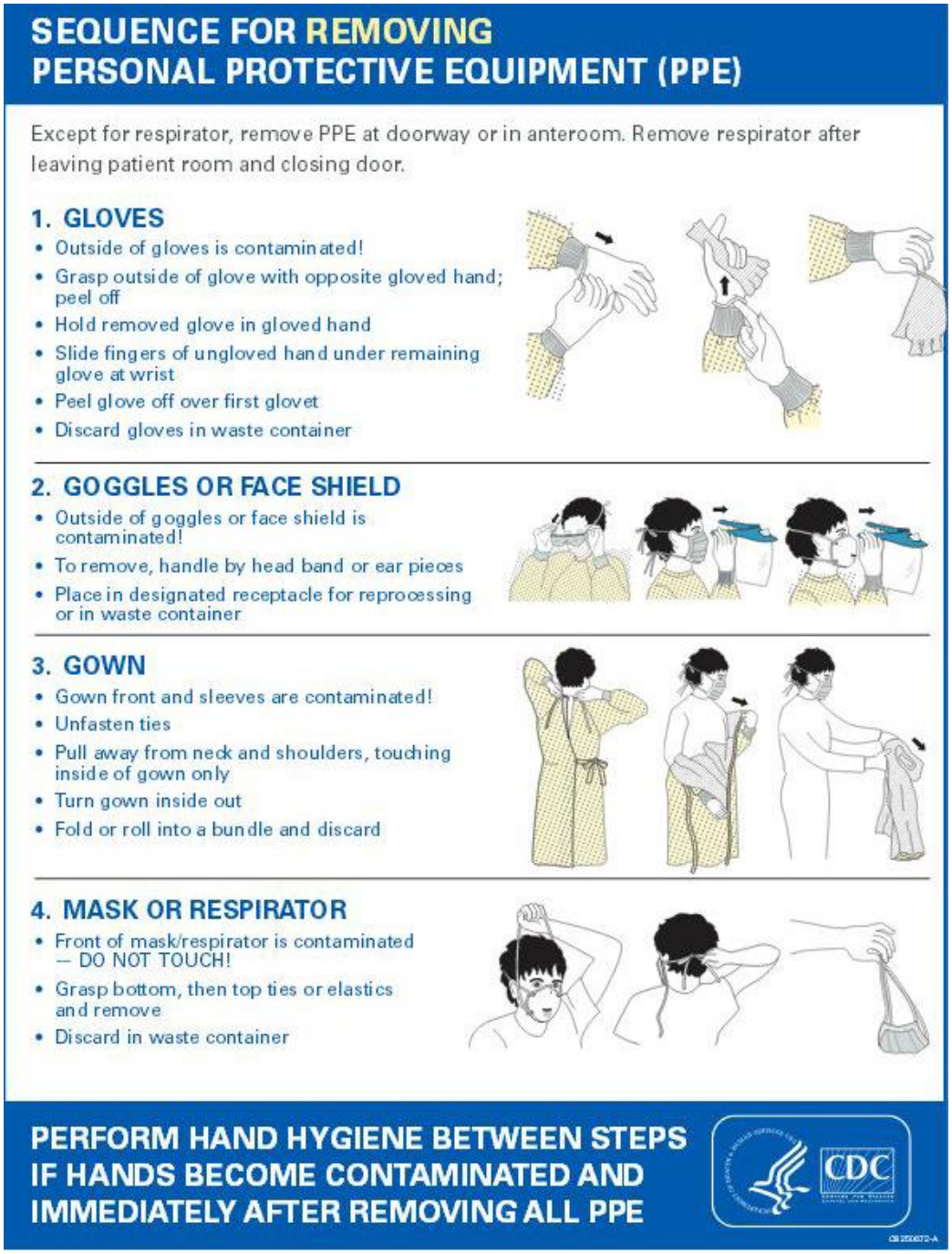
4. GLOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

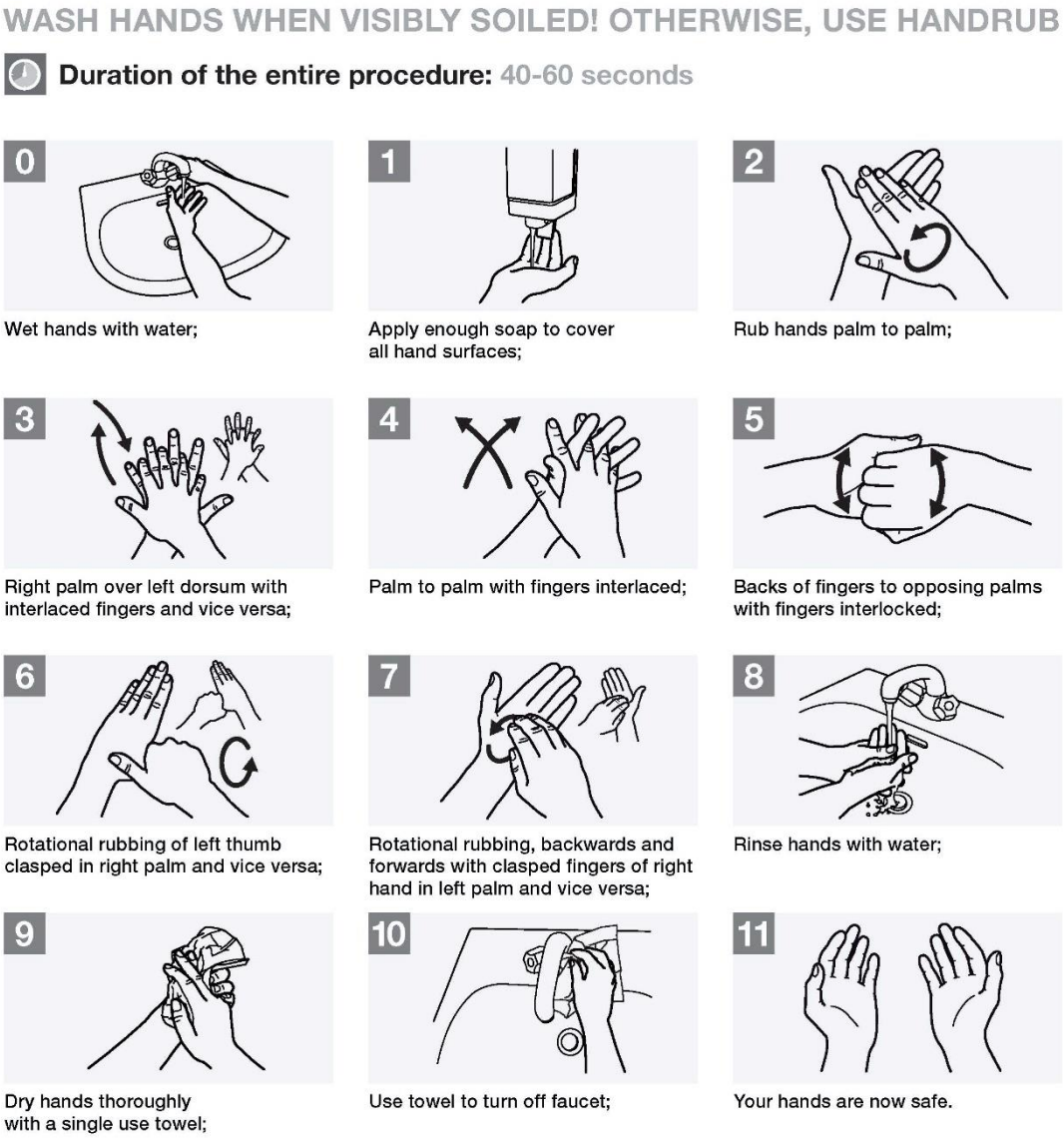
- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene



Source: Global Resilience Systems

Centers for Disease Control and Prevention

Appendix III. Basic technique for routine hand washing



Source: World Health Organization

Appendix IV. Patient transfer precautions

GENERAL MEASURES	- The patient must be washed and with clean clothes - If a wheelchair or a stretcher is needed, it must be covered with a clean sheet. - Healthcare workers will use gloves and gown during the transfer only if they are going to have direct contact with the patient. After reaching their destiny, they will dispose of the PPE and wash their hands.
CONTACT	- Contaminated areas must be covered with clean dressings, if possible, or the patient must be covered with clean gown and sheets before proceeding with the transfer.
DROPLETS	-A surgical mask with facial adjustment must be put on the patient before leaving the bedroom - If the mask had to be removed, the healthcare workers must put one themselves as long as they are within a meter radius from the patient
AIR	- A surgical mask with facial adjustment must be put on the patient before leaving the bedroom - If the mask had to be removed, the healthcare workers must put one of high efficacy themselves.

Source: Hospital Isolation Study Group

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