Infection prevention and control in patient and health workers safety during the COVID-19 pandemic

Joao Toledo, MD, MSc – PAHO / PHE-IHM

World Patient Safety Day

virtual, September 18, 2020

PAHO Pan American Health Organization World Health Organization Americas

Infection prevention and control and quality of care

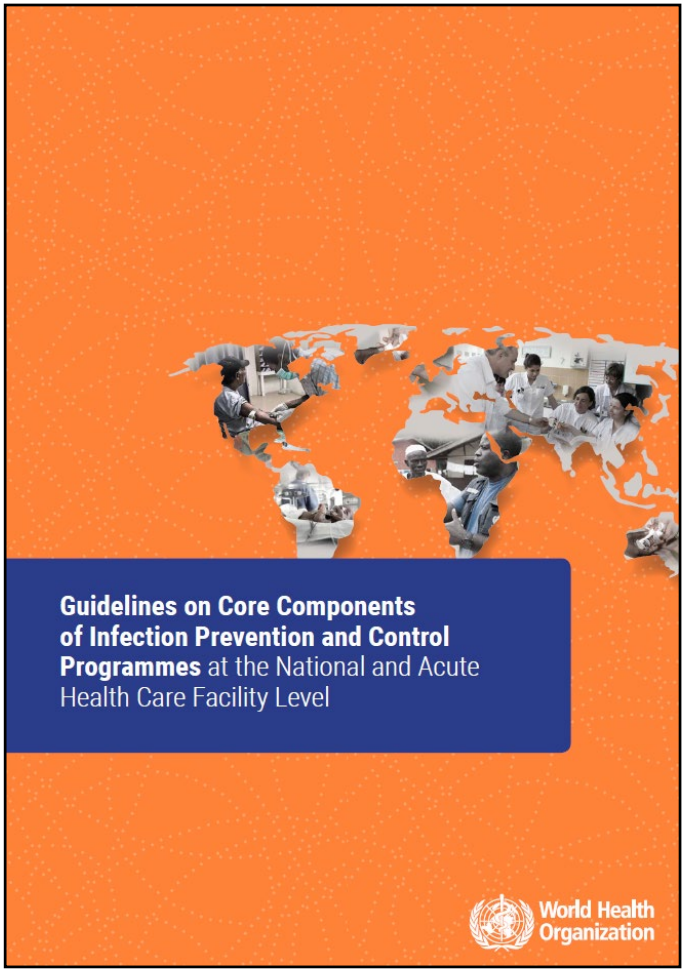
Perspective	Infection control	Continuous quality improvement	Patient safety
Focus	Adverse health events	Indicators	Errors, near misses
Determinants	Risk factors	Patient mix	Root cause, human factors, reporting, learning
Monitoring	Surveillance, response	Performance measurement, improvement	System improvement
Goal	Prevention	Performance improvement	System improvement
Key professional	Health-care epidemiologists, infection control professionals	Quality managers, accreditation officials	Engineers, health-care purchasers, consumers

Gerberding JL. Health-care quality promotion through infection prevention: beyond 2000. Emerg Infect Dis. 2001 Mar-Apr;7(2):363-6. doi: 10.3201/eid0702.010244. PMID: 11294741; PMCID: PMC2631715.

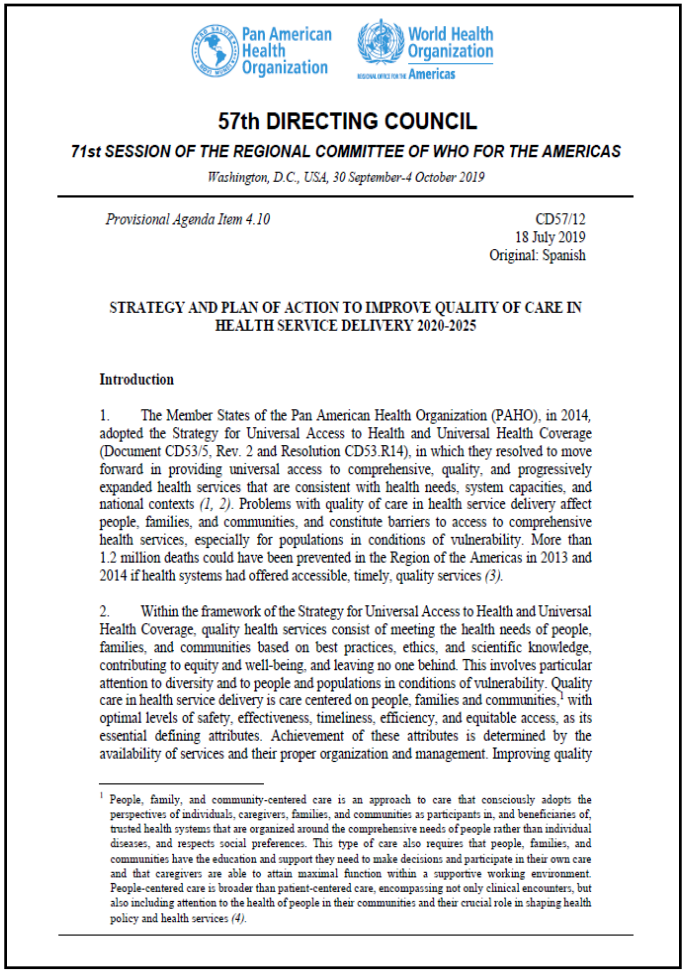
Tempora mutantur, nos et mutamur in illis.
(Times change, and we change with them.)
Owen's Epigrammata, 1615

Infection prevention and control and quality of care

https://iris.paho.org/handle/10665.2/51621



https://www.who.int/infection-prevention/tools/core-components/en/



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57th DIRECTING COUNCIL

71st SESSION OF THE REGIONAL COMMITTEE OF WHO FOR THE AMERICAS

Washington, D.C., USA, 30 September-4 October 2019

Provisional Agenda Item 4.10

CD57/12
18 July 2019
Original: Spanish

STRATEGY AND PLAN OF ACTION TO IMPROVE QUALITY OF CARE IN HEALTH SERVICE DELIVERY 2020-2025

Introduction

1. The Member States of the Pan American Health Organization (PAHO), in 2014, adopted the Strategy for Universal Access to Health and Universal Health Coverage (Document CD53/5, Rev. 2 and Resolution CD53.R14), in which they resolved to move forward in providing universal access to comprehensive, quality, and progressively expanded health services that are consistent with health needs, system capacities, and national contexts *(1, 2)*. Problems with quality of care in health service delivery affect people, families, and communities, and constitute barriers to access to comprehensive health services, especially for populations in conditions of vulnerability. More than 1.2 million deaths could have been prevented in the Region of the Americas in 2013 and 2014 if health systems had offered accessible, timely, quality services *(3)*.

2. Within the framework of the Strategy for Universal Access to Health and Universal Health Coverage, quality health services consist of meeting the health needs of people, families, and communities based on best practices, ethics, and scientific knowledge, contributing to equity and well-being, and leaving no one behind. This involves particular attention to diversity and to people and populations in conditions of vulnerability. Quality care in health service delivery is care centered on people, families and communities,[1] with optimal levels of safety, effectiveness, timeliness, efficiency, and equitable access, as its essential defining attributes. Achievement of these attributes is determined by the availability of services and their proper organization and management. Improving quality

[1] People, family, and community-centered care is an approach to care that consciously adopts the perspectives of individuals, caregivers, families, and communities as participants in, and beneficiaries of, trusted health systems that are organized around the comprehensive needs of people rather than individual diseases, and respects social preferences. This type of care also requires that people, families, and communities have the education and support they need to make decisions and participate in their own care and that caregivers are able to attain maximal function within a supportive working environment. People-centered care is broader than patient-centered care, encompassing not only clinical encounters, but also including attention to the health of people in their communities and their crucial role in shaping health policy and health services *(4)*.

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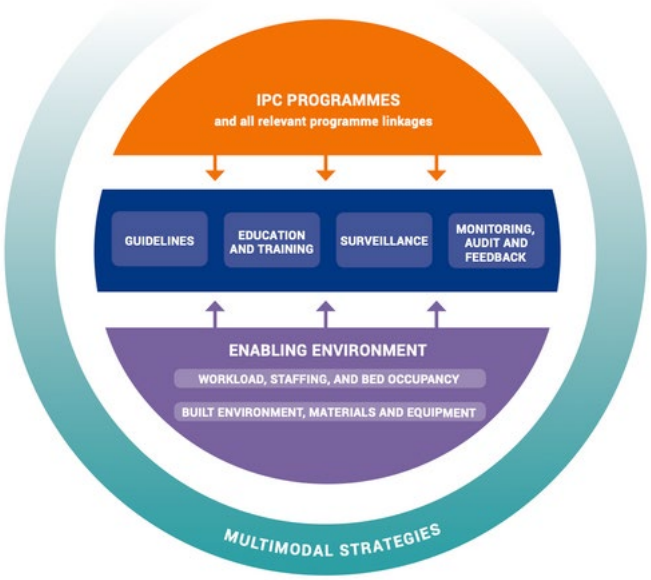
WHO IPC Core Components and its challenges for implementation

Strategic Line of Action 1: Implement continuous processes to improve the quality of care to people, families, and communities in the delivery of comprehensive health services (PAHO – CD57/12, 2019)



https://www.who.int/infection-prevention/tools/core-components/en/ and https://doi.org/10.1016/S1473-3099(17)30479-6

Core Component	Comment
1 – IPC programmes	• Political commitment for IPC in MoH • Organized and functional IPC program at the hospital level
2 – IPG guidelines 3 – IPC education and training	• Implementation science and knowledge transfer
4 – Surveillance	• Surveillance data – lack of standards and trendlines / regular surveillance x HAI surveillance • Laboratory support: readiness / data misinterpretation • AMR Agenda and Pillar 3
5 – Multimodal strategies	• Local contexts
6 – Monitoring/ audit of IPC practices and feedback	• M&E culture / environment • M&E of IPC Program
7 – Workload, staffing and bed occupancy	• Trained human Resources • High turnover of HCW
8 – Built environment, materials and equipment for IPC at the facility level	• Lack of allocation of specific funds

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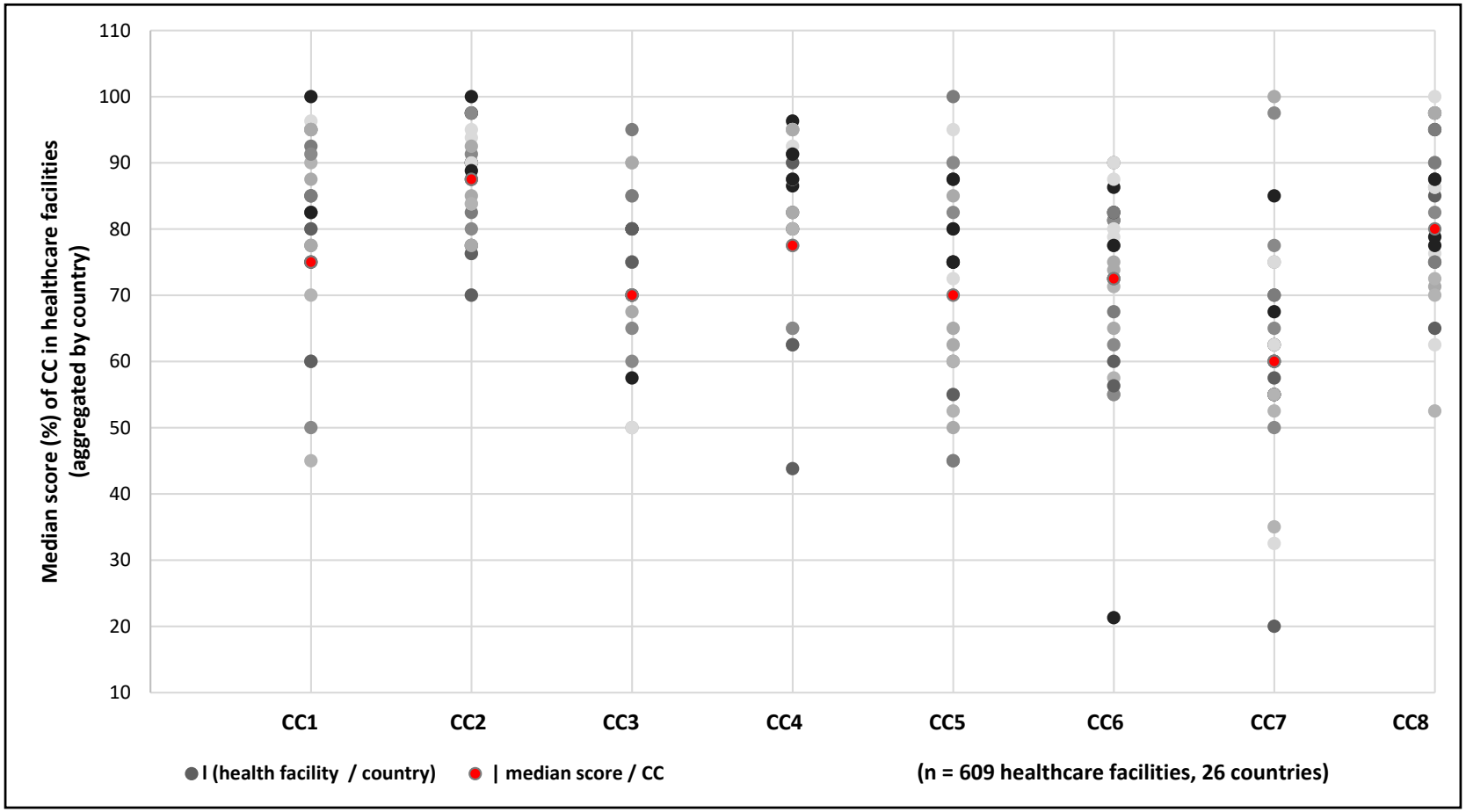
Implementation of WHO Core Components in the Region



preliminary data, April 2020 – not published

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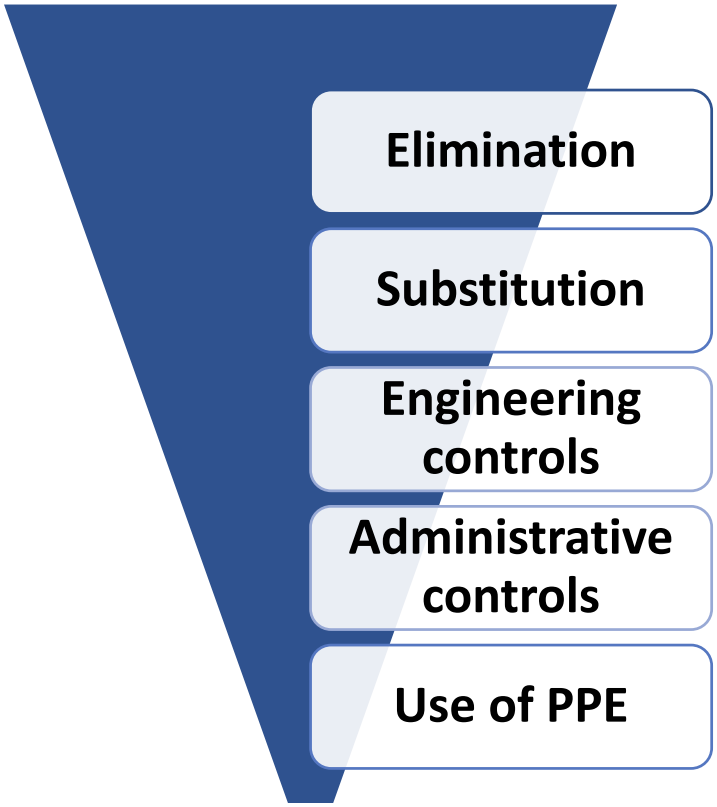
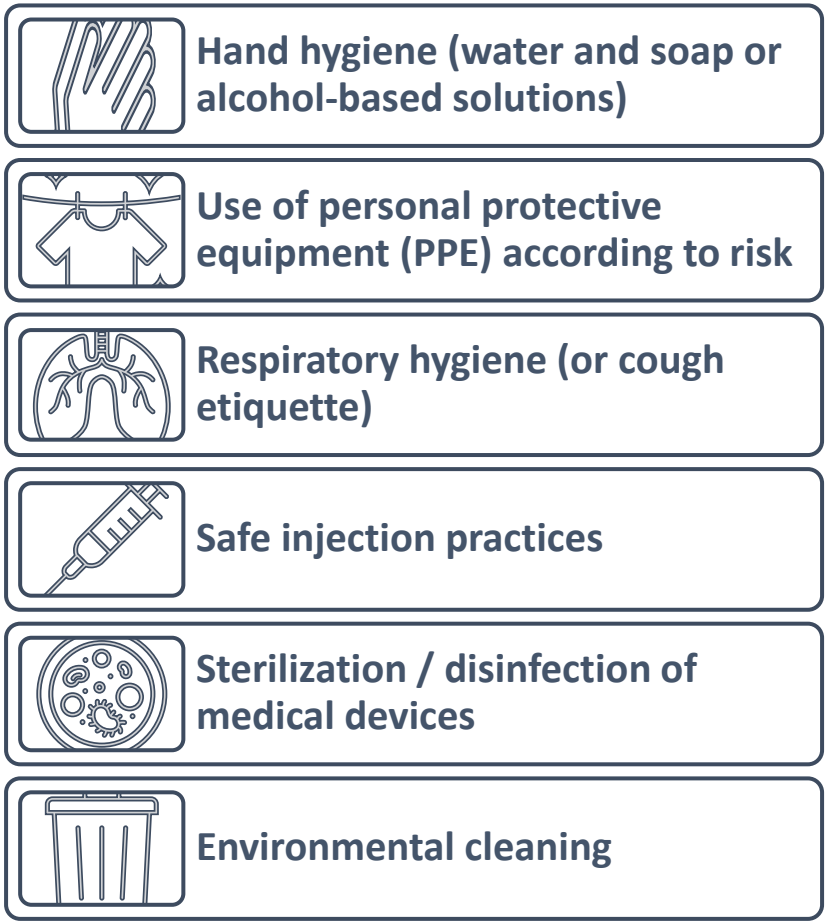
Infection Prevention and Control: practices and hierarchies

MOST EFFECTIVE



LEAST EFFECTIVE

Adapted from NIOSH, 2020



PAHO. Prevention and Control of Healthcare associated infections – Basic Recommendations"- PAHO, 2018

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COVID-19 and the shortage of PPE

Optimize PPE availability

- Minimize PPE need
- Use PPE appropriately
- Coordinate PPE supply chain

Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19)

Interim guidance
19 March 2020

World Health Organization

Background

This document summarizes WHO's recommendations for the rational use of personal protective equipment (PPE) in health care and community settings, as well as during the handling of cargo; in this context, PPE includes gloves, medical masks, goggles or a face shield, and gowns, as well as for specific procedures, respirators (i.e. N95 or FFP2 standard or equivalent) and aprons. It is intended for those involved in distributing and managing PPE, as well as public health authorities and individuals in health care and community settings, and it provides information about when PPE use is most appropriate.

WHO will continue update these recommendations as new information becomes available.

Preventive measures for COVID-19 disease

Based on the available evidence, the COVID-19 virus is transmitted between people through close contact and droplets, not by airborne transmission. The people most at risk of infection are those who are in close contact with a COVID-19 patient or who care for COVID-19 patients.

Preventive and mitigation measures are key. The most effective preventive measures in the community include:

- performing hand hygiene frequently with an alcohol-based hand rub if your hands are not visibly dirty or with soap and water if hands are dirty;
- avoiding touching your eyes, nose, and mouth;
- practicing respiratory hygiene by coughing or sneezing into a bent elbow or tissue and then immediately disposing of the tissue;
- wearing a medical mask if you have respiratory symptoms and performing hand hygiene after disposing of the mask;
- maintaining social distance (a minimum of 1 metre) from persons with respiratory symptoms.

Additional precautions are required by health care workers to protect themselves and prevent transmission in the healthcare setting. Precautions to be implemented by health care workers caring for patients with COVID-19 include using PPE appropriately; this involves selecting proper PPE and being trained in how to put on, remove, and dispose of it.

PPE is only one effective measure within a package of administrative and environmental and engineering controls, as described in WHO's Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care.[1] These controls are summarized here.

- **Administrative controls** include ensuring resources for infection prevention and control (IPC) measures, such as appropriate infrastructure, the development of clear IPC policies, facilitated access to laboratory testing, appropriate triage and placement of patients, adequate staff-to-patient ratios, and training of staff.
- **Environmental and engineering controls** aim at reducing the spread of pathogens and the contamination of surfaces and inanimate objects. They include providing adequate space to allow social distance of at least 1 m to be maintained between patients and between patients and health care workers and ensuring the availability of well-ventilated isolation rooms for patients with suspected or confirmed COVID-19.

COVID-19 is a respiratory disease that is different from Ebola virus disease (EVD), which is transmitted through infected bodily fluids. Because of these differences in transmission, the PPE requirements for COVID-19 are different from those required for EVD. Specifically, coveralls (sometimes called Ebola PPE) are not required when managing COVID-19 patients.

Disruptions in the global supply chain of PPE

The current global stockpile of PPE is insufficient, particularly for medical masks and respirators; the supply of gowns and goggles is soon expected to be insufficient also. Surging global demand – driven not only by the number of COVID-19 cases but also by misinformation, panic buying, and stockpiling – will result in further shortages of PPE globally. The capacity to expand PPE production is limited, and the current demand for respirators and masks cannot be met, especially if widespread inappropriate use of PPE continues.

1

https://apps.who.int/iris/handle/10665/331498

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Beyond the appropriate use of personal protective equipment (PPE)

Core Component	Comment
2 – IPG guidelines	**Develop, adapt and implement** guidelines and / or SOPs **Inclusion** of other health workers
3 – IPC education and training	**Train** health workers in the proper use of PPE
5 – Multimodal strategies	**Display signs in the isolation area** indicating how don and doff PPE
8 – Built environment, materials and equipment for IPC at the facility level	Guarantee an adequate **supply of PPE** in the health services, with the recommended specifications

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[Qualitative Review]

Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases: a rapid qualitative evidence synthesis

Catherine Houghton[1], Pauline Meskell[2], Hannah Delaney[3], Mike Smalle[4], Claire Glenton[5], Andrew Booth[6], Xin Hui S Chan[7], Declan Devane[1], Linda M Biesty[1]

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Editorial group: Cochrane Effective Practice and Organisation of Care Group.
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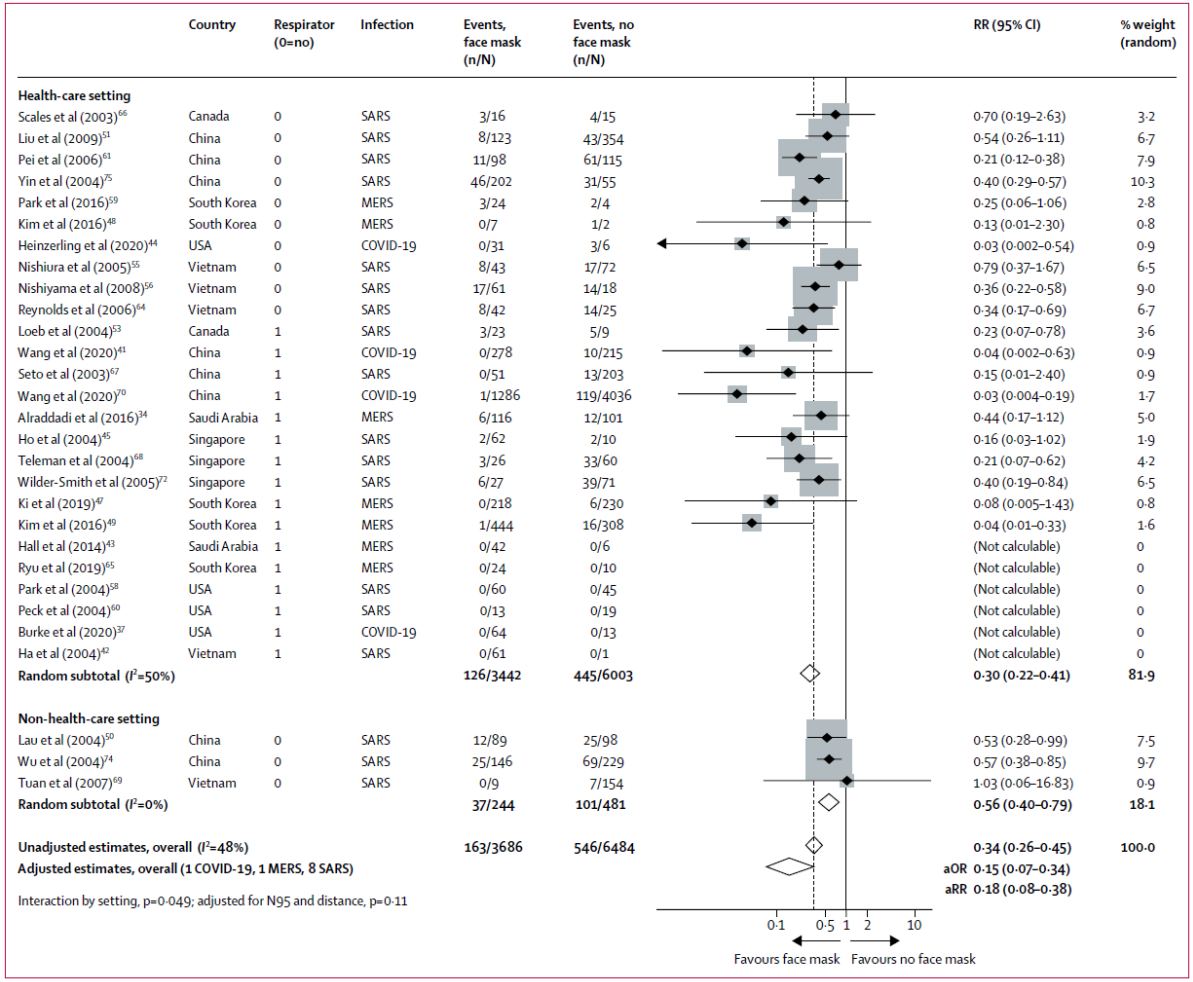
Citation: Houghton C, Meskell P, Delaney H, Smalle M, Glenton C, Booth A, Chan XHS, Devane D, Biesty LM. Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases: a rapid qualitative evidence synthesis. *Cochrane Database of Systematic Reviews* 2020, Issue 4. Art. No.: CD013582. DOI: 10.1002/14651858.CD013582.

Houghton C, Meskell P, Delaney H, Smalle M, Glenton C, Booth A, Chan XHS, Devane D, Biesty LM. Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases: a rapid qualitative evidence synthesis. Cochrane Database of Systematic Reviews 2020, Issue 4. Art. No.: CD013582. DOI: 10.1002/14651858.CD013582.

https://www.paho.org/en/documents/technical-specifications-medical-devices-case-management-covid-19-healthcare-settings

Use of masks and COVID-19



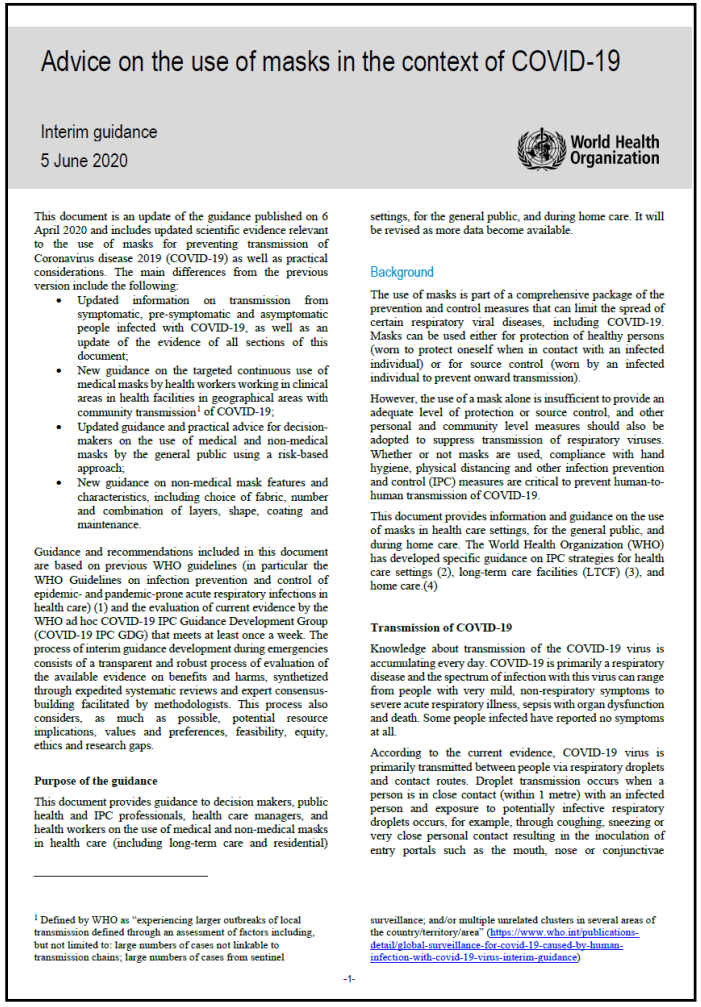
	Country	Respirator (0=no)	Infection	Events, face mask (n/N)	Events, no face mask (n/N)	RR (95% CI)	% weight (random)
Health-care setting							
Scales et al (2003)[66]	Canada	0	SARS	3/16	4/15	0·70 (0·19–2·63)	3·2
Liu et al (2009)[51]	China	0	SARS	8/123	43/354	0·54 (0·26–1·11)	6·7
Pei et al (2006)[61]	China	0	SARS	11/98	61/115	0·21 (0·12–0·38)	7·9
Yin et al (2004)[75]	China	0	SARS	46/202	31/55	0·40 (0·29–0·57)	10·3
Park et al (2016)[59]	South Korea	0	MERS	3/24	2/4	0·25 (0·06–1·06)	2·8
Kim et al (2016)[48]	South Korea	0	MERS	0/7	1/2	0·13 (0·01–2·30)	0·8
Heinzerling et al (2020)[44]	USA	0	COVID-19	0/31	3/6	0·03 (0·002–0·54)	0·9
Nishiura et al (2005)[55]	Vietnam	0	SARS	8/43	17/72	0·79 (0·37–1·67)	6·5
Nishiyama et al (2008)[56]	Vietnam	0	SARS	17/61	14/18	0·36 (0·22–0·58)	9·0
Reynolds et al (2006)[64]	Vietnam	0	SARS	8/42	14/25	0·34 (0·17–0·69)	6·7
Loeb et al (2004)[53]	Canada	1	SARS	3/23	5/9	0·23 (0·07–0·78)	3·6
Wang et al (2020)[41]	China	1	COVID-19	0/278	10/215	0·04 (0·002–0·63)	0·9
Seto et al (2003)[67]	China	1	SARS	0/51	13/203	0·15 (0·01–2·40)	0·9
Wang et al (2020)[70]	China	1	COVID-19	1/1286	119/4036	0·03 (0·004–0·19)	1·7
Alraddadi et al (2016)[34]	Saudi Arabia	1	MERS	6/116	12/101	0·44 (0·17–1·12)	5·0
Ho et al (2004)[45]	Singapore	1	SARS	2/62	2/10	0·16 (0·03–1·02)	1·9
Teleman et al (2004)[68]	Singapore	1	SARS	3/26	33/60	0·21 (0·07–0·62)	4·2
Wilder-Smith et al (2005)[72]	Singapore	1	SARS	6/27	39/71	0·40 (0·19–0·84)	6·5
Ki et al (2019)[47]	South Korea	1	MERS	0/218	6/230	0·08 (0·005–1·43)	0·8
Kim et al (2016)[49]	South Korea	1	MERS	1/444	16/308	0·04 (0·01–0·33)	1·6
Hall et al (2014)[43]	Saudi Arabia	1	MERS	0/42	0/6	(Not calculable)	0
Ryu et al (2019)[65]	South Korea	1	MERS	0/24	0/10	(Not calculable)	0
Park et al (2004)[58]	USA	1	SARS	0/60	0/45	(Not calculable)	0
Peck et al (2004)[60]	USA	1	SARS	0/13	0/19	(Not calculable)	0
Burke et al (2020)[37]	USA	1	COVID-19	0/64	0/13	(Not calculable)	0
Ha et al (2004)[42]	Vietnam	1	SARS	0/61	0/1	(Not calculable)	0
Random subtotal (I^2=50%)				**126/3442**	**445/6003**	**0·30 (0·22–0·41)**	**81·9**
Non-health-care setting							
Lau et al (2004)[50]	China	0	SARS	12/89	25/98	0·53 (0·28–0·99)	7·5
Wu et al (2004)[74]	China	0	SARS	25/146	69/229	0·57 (0·38–0·85)	9·7
Tuan et al (2007)[69]	Vietnam	0	SARS	0/9	7/154	1·03 (0·06–16·83)	0·9
Random subtotal (I^2=0%)				**37/244**	**101/481**	**0·56 (0·40–0·79)**	**18·1**
Unadjusted estimates, overall (I^2=48%)				**163/3686**	**546/6484**	**0·34 (0·26–0·45)**	**100·0**
Adjusted estimates, overall (1 COVID-19, 1 MERS, 8 SARS)						**aOR 0·15 (0·07–0·34)**	
						aRR 0·18 (0·08–0·38)	

Interaction by setting, p=0·049; adjusted for N95 and distance, p=0·11

Figure 4: **Forest plot showing unadjusted estimates for the association of face mask use with viral infection causing COVID-19, SARS, or MERS**
SARS=severe acute respiratory syndrome. MERS=Middle East respiratory syndrome. RR=relative risk. aOR=adjusted odds ratio. aRR=adjusted relative risk.

Chu DK et al. Lancet. 2020 27 June-3 July; 395(10242): 1973–1987.
doi: 10.1016/S0140-6736(20)31142-9

Use of masks and COVID-19



Advice on the use of masks in the context of COVID-19

Interim guidance
5 June 2020

World Health Organization

This document is an update of the guidance published on 6 April 2020 and includes updated scientific evidence relevant to the use of masks for preventing transmission of Coronavirus disease 2019 (COVID-19) as well as practical considerations. The main differences from the previous version include the following:

- Updated information on transmission from symptomatic, pre-symptomatic and asymptomatic people infected with COVID-19, as well as an update of the evidence of all sections of this document;
- New guidance on the targeted continuous use of medical masks by health workers working in clinical areas in health facilities in geographical areas with community transmission[1] of COVID-19;
- Updated guidance and practical advice for decision-makers on the use of medical and non-medical masks by the general public using a risk-based approach;
- New guidance on non-medical mask features and characteristics, including choice of fabric, number and combination of layers, shape, coating and maintenance.

Guidance and recommendations included in this document are based on previous WHO guidelines (in particular the WHO Guidelines on infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care) (1) and the evaluation of current evidence by the WHO ad hoc COVID-19 IPC Guidance Development Group (COVID-19 IPC GDG) that meets at least once a week. The process of interim guidance development during emergencies consists of a transparent and robust process of evaluation of the available evidence on benefits and harms, synthetized through expedited systematic reviews and expert consensus-building facilitated by methodologists. This process also considers, as much as possible, potential resource implications, values and preferences, feasibility, equity, ethics and research gaps.

Purpose of the guidance

This document provides guidance to decision makers, public health and IPC professionals, health care managers, and health workers on the use of medical and non-medical masks in health care (including long-term care and residential) settings, for the general public, and during home care. It will be revised as more data become available.

Background

The use of masks is part of a comprehensive package of the prevention and control measures that can limit the spread of certain respiratory viral diseases, including COVID-19. Masks can be used either for protection of healthy persons (worn to protect oneself when in contact with an infected individual) or for source control (worn by an infected individual to prevent onward transmission).

However, the use of a mask alone is insufficient to provide an adequate level of protection or source control, and other personal and community level measures should also be adopted to suppress transmission of respiratory viruses. Whether or not masks are used, compliance with hand hygiene, physical distancing and other infection prevention and control (IPC) measures are critical to prevent human-to-human transmission of COVID-19.

This document provides information and guidance on the use of masks in health care settings, for the general public, and during home care. The World Health Organization (WHO) has developed specific guidance on IPC strategies for health care settings (2), long-term care facilities (LTCF) (3), and home care.(4)

Transmission of COVID-19

Knowledge about transmission of the COVID-19 virus is accumulating every day. COVID-19 is primarily a respiratory disease and the spectrum of infection with this virus can range from people with very mild, non-respiratory symptoms to severe acute respiratory illness, sepsis with organ dysfunction and death. Some people infected have reported no symptoms at all.

According to the current evidence, COVID-19 virus is primarily transmitted between people via respiratory droplets and contact routes. Droplet transmission occurs when a person is in close contact (within 1 metre) with an infected person and exposure to potentially infective respiratory droplets occurs, for example, through coughing, sneezing or very close personal contact resulting in the inoculation of entry portals such as the mouth, nose or conjunctivae

[1] Defined by WHO as "experiencing larger outbreaks of local transmission defined through an assessment of factors including, but not limited to: large numbers of cases not linkable to transmission chains; large numbers of cases from sentinel surveillance; and/or multiple unrelated clusters in several areas of the country/territory/area" (https://www.who.int/publications-detail/global-surveillance-for-covid-19-caused-by-human-infection-with-covid-19-virus-interim-guidance)

-1-

- Key concept:
  - Respiratory protection (HCW)
  - Source control (cases/patients/exposed)

- Countries have the final decision on the decision-making process

"(…) The following **potential harms and risks** should be carefully taken into account when adopting this approach of **targeted continuous medical mask use**, including: **self-contamination** due to the manipulation of the mask by contaminated hands, **false sense of security**, leading to potentially **less adherence to well recognized preventive measures** such as physical distancing and hand hygiene (…)"

https://apps.who.int/iris/handle/10665/332293

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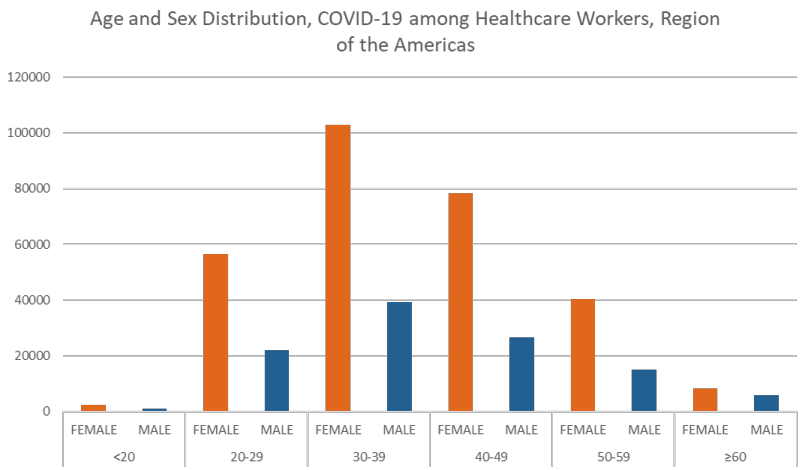
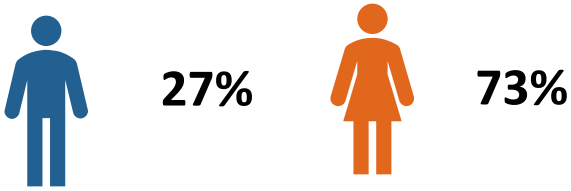
The burden of COVID-19 among health workers in the Region of the Americas

627,020 cases

2,585 deaths





Source – Line list of reported cases with exception of Brazil, Mexico, Panama, Paraguay, USA (sit reps) – 10 Sept 2020

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Occupational risks for infections in healthcare settings

- Late recognition or suspicion of COVID-19 in patients
- Work in high risk department
- Longer duty hours
- Suboptimal IPC – hand hygiene
- Lack of or improper use of PPE
- Insufficient training
- Long exposure to large number of COVID-19 patients

WHO Situation Report, April 11, 2020 - https://www.who.int/docs/default-source/coronaviruse/situati reports/20200411-sitrep-82-covid-19.pdf?sfvrsn=74a5d15_2

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REGIONAL OFFICE FOR THE Americas

Ann Intern Med. **2020;173:120-136. doi:10.7326/M20-1632**

REVIEW

Annals of Internal Medicine

Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers

A Living Rapid Review

Roger Chou, MD; Tracy Dana, MLS; David I. Buckley, MD, MPH; Shelley Selph, MD, MPH; Rongwei Fu, PhD; and Annette M. Totten, PhD

Data synthesis:

- Depression, anxiety, and psychological distress were common in HCWs during the coronavirus disease 2019 outbreak.
- The strongest evidence on risk factors was on PPE use and decreased infection risk.
- The association was most consistent for masks but was also observed for gloves, gowns, eye protection, and handwashing;
- Certain exposures (such as involvement in intubations, direct patient contact, or contact with bodily secretions) were associated with increased infection risk.
- Infection control training was associated with decreased risk.

Conclusion:

- Health care workers experience significant burdens from coronavirus infections, including SARS-CoV-2.
- Use of PPE and infection control training are associated with decreased infection risk, and certain exposures are associated with increased risk.

Activities to protect health workers and patients from COVID-19

CASE CONTROL STUDY ON HEALTH WORKERS COVID-19: A RESEARCH PROTOCOL

https://www.who.int/publications/i/item/assessment-of-risk-factors-for-coronavirus-disease-2019-(covid-19)-in-health-workers-protocol-for-a-case-control-study

World Health Organization

Research & Development Infection Prevention and Control Group - WHO Unity Studies

Final remarks

- Quality care in health service delivery depends of health workforce;
- Implementation of the WHO IPC Core Components is vital to maintain resilient health services, with provision of quality care and guarantee a safe and decent environment for both health workers and patients.

Thank you