Supplementary Information for

Covid-19 airborne transmission and its prevention: waiting for evidence or applying the precautionary principle?

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Appendix 1 - List of papers removed with reasons:

Reason #1: description of an index case but without confirmed secondary cases

- Buchholz U, Müller MA, Nitsche A, et al. Contact investigation of a case of human novel coronavirus infection treated in a German hospital, October-November 2012. Euro Surveill. 2013;18(8):20406. Published 2013 Feb 21.

- Lillie PJ, Samson A, Li A, et al. Novel coronavirus disease (Covid-19): The first two patients in the UK with person to person transmission. J Infect. 2020;80(5):578-606. doi:10.1016/j.jinf.2020.02.020;

- Park BJ, Peck AJ, Kuehnert MJ, et al. Lack of SARS transmission among healthcare workers, United States. Emerg Infect Dis. 2004;10(2):244-248. doi:10.3201/eid1002.030793;

- Reuss A, Litterst A, Drosten C, et al. Contact investigation for imported case of Middle East respiratory syndrome, Germany. Emerg Infect Dis. 2014;20(4):620-625. doi:10.3201/eid2004.131375.

Reason #2: lack of epidemiological analysis

- Nam HS, Yeon MY, Park JW, Hong JY, Son JW. Healthcare worker infected with Middle East Respiratory Syndrome during cardiopulmonary resuscitation in Korea, 2015. Epidemiol Health. 2017;39:e2017052. doi:10.4178/epih.e2017052;

- Meng X, Huang X, Zhou P, Li C, Wu A. Alert for SARS-CoV-2 infection caused by fecal aerosols in rural areas in China. Infect Control Hosp Epidemiol. 2020;1. doi:10.1017/ice.2020.114

Appendix 2 – Description of the papers included in the literature revision, divided on the basis of the aim of the study

Table S1. *In vitro* studies on the air contamination by coronaviruses (listed in chronological order)

	Aim	Test coronavirus and viral suspension load before aerosolization [a]	Duration of the assay	Experimental apparatus	Environmental parameters		Aerosol collection system and operative parameters (sampling flow rate, sampling time)
					T (°C)	RH (%)	
Ijaz et al., 1985 [49]	Survival at different RH and temperatur e levels	HCoV-229E 3-4.2 × 10^7 PFU/ml	24-72 hr (five samples collected over the course of the experiment)	6-jet collison nebulizer using Triptose Phospahte Broth (TPB) as spry fluid. Viral aerosol is stored into a 300-liter stainless-steel rotating (4 rpm) drum	6, 20	30, 50, 80	All-glass impinger using TPB as collection fluid (5.6 L/min, 2 min)
Ijaz et al., 1987 [44]	Survival at different RH levels	HCoV-229E 10^3 PFU/ml	24 hr (five samples collected over the course of the experiment)	6-jet collison nebulizer using TPB as spry fluid. Viral aerosol is stored into a 300-liter stainless-steel rotating (4 rpm) drum	20	30, 50, 80	All-glass impinger using TPB as collection fluid (5.6 L/min, 1 min)
Agranovski et al., 2004 [45]	Collection efficiency of aerosol samplers	SARS-CoV 10^4 $TCID_{50}$/ml	4-hr (continuous aerosol collection)	NA	24	55	Personal bioaerosol sampler (4 L/min, 4-hr)
Tseng & Li, 2005 [46]	Collection efficiency of four commonly used bioaerosol samplers	phage phi 6 10^9–10^{10} PFU/ml	Variable	3-jet Collision nebulizer using deionized water as spry fluid. Viral aersol is injected into a for virus aerosolization into a test chamber	Not specifi ed	20, 55, 85	- Andersen impactor 1-STG sampler (28.3 L/min, 5 min); - AGI-30 impinger using sterile deionized water as collection fluid (12.5 L/min, 5 min); - Gelatin filter with 3.0-μm pore size (30 L/min, 5 min); - Nuclepore polycarbonate filter with a 0.4-μm pore size (2L/min, 20 min)

Farnsworth et al., 2006 [48]	Collection and recovery efficiency of HVAC filters	TGEV ~ 10^5 $TCID_{50}$	10-min	Collison nebulizer using viral growth media [b] as spray fluid. Viral aerosol is injected into an air filter testing apparatus equipped with both HAV filter and impinger samplers for virus titration	22-24	37	- HVAC filter media, rated MERV 14 by ASHRAE; - AGI-30 impinger with viral growth media [b] as collection fluid (12.5 L/min, 10 min)
Kim et al., 2007 [47]	Recovery efficiency of HVAC filters	TGEV geometric mean of 8.51 × 10^4 $TCID_{50}$/ml	10-min	6-jet collison nebulizer using viral growth media [b] as spray fluid. Viral aerosol is injected into an air filter testing apparatus equipped with both HAV filter and impinger samplers for virus titration	23	30, 50, 70, 90	- HVAC filter media, rated MERV 14 by ASHRAE (exposed to aerosol for 10 min); - Two impinger samplers (AGI-30, BioSamplers) with viral growth media as collection fluid (12.5 L/min, 10 min)
Walker & Ko, 2007 [55]	Survival at under UV irradiation	MHV 10^4-10^5 PFU/ml	35 min (four samples collected over the course of the experiment)	6-jet collison nebulizer using viral growth media [b] as spray fluid. Viral aerosol is injected into an experimental chamber	Not specified	50	AGI-30 liquid impinger with viral growth media [b] as collection fluid (12.5 L/min, 15 min)
van Doremalen et al., 2013 [52]	Survival at different RH levels	MERS-CoV 10^6 $TCID_{50}$/ml	10 min (continuous aerosol collection during aerosolisation)	AeroMP aerosol management platform	20	40, 70	All Glass Impinger with viral growth media [b] as collection fluid (12.5 L/min, 10 min)
Pyankov et al., 2018 [51]	Survival at different RH and temperature levels	MERS-CoV ~ 10^6 $TCID_{50}$/ml	1-hr (five samples collected over the course of	3-jet collison nebulizer for virus aerosolization into a rotational chamber	25, 38	79, 24	Personal bioaerosol samplers with viral growth media [b] as collection fluid (4 L/min, 2 min)

			the experiment)				
Prussin et al., 2018 [50]	Survival at different RH, absolute humidity and temperature levels	phage phi 6 10^8 to 10^{10} PFU/ml	2-hr (seven samples collected over the course of each experiment)	Chamber equipped to control RH and AH, incubated in temperature-controlled rooms	14, 19, 25, 37	23, 33, 43, 61, 75, 85, 98	NA [c]
van Doremalen et al., 2020 [53]	Survival at fixed RH and temperature	- SARS-CoV-1 ~ 10^7 $TCID_{50}$/ml - SARS-CoV-2 (Washington variant) ~ 10^5 $TCID_{50}$/ml	3-hr (five sample collected over the experiment)	3-jet collison nebulizer for virus aerosolization into a Goldberg drum	21-23	65	47mm gelatin filter
Smither et al., 2020 [54]	Survival at different RH levels	SARS-CoV-2 (UK variant) ~ 10^6 $TCID_{50}$/ml	90-min (five sample collected over the experiment)	3-jet collision nebulizer for virus aerosolization using artificial saliva or tissue culture media as spry fluid into a 40L Goldberg drum	19-22	40-60, 68-88	Midget impingers with viral growth media [b] as collection fluid (4 L/min, 1 min)

[a] MERS-CoV, SARS-CoV and SARS-CoV-2 have been propagated and titrated on Vero E6 cells; MHV on DBT cell line; TGEV on swine testis (ST) cells; HCoV-229E on L132 cells; phage phi6 on *Pseudomonas syringae*

[b] Viral growth media represents the maintenance medium of the cell lines used for virus replication

[c] The assay was performed with droplets

Table S2. Environmental air monitoring studies classified according to the type of coronavirus

Coronavirus		Sampling site and samples (type and number)	Air sampling and detection methods	Results	Ref.
Animal CoVs	PRCoV	Nonhealthcare setting (USA): 46 pigs artificially infected. Oral-nasal swabs, expired air by the pigs, air samples from the room.	AGI-30 impinger using viral growth media as collection fluid (12.5 L/min, 5 min). (RT)-PCR	Positivity in all swab samples but in no air samples	Hermann et al., 2008 [60]
	PEDV	Nonhealthcare setting (USA): - 6 air samples from experimental condition of pigs artificially infected with PEDV; - 62 air samples collected from field monitoring in swine herds.	Liquid cyclonic air collector using viral growth media as collection fluid (200 L/min, 30 min). Real time RT-PCR and bioassay for positive samples	All experimental samples positive for molecular test and infectivity. 11/62 (18%) of field samples positive for viral genome, none for the infectivity	Alonso et al., 2014 [61]
	PEDV	Nonhealthcare setting (USA): 54 air samples from experimental condition of pigs artificially infected with PEDV (48 collected using Andersen cascade impactor and 6 using liquid cyclonic collector)	Liquid cyclonic air collector using viral growth media as collection fluid (200 L/min, 30 min) and an Andersen cascade impactor separating particles into 8 size intervals (28.3 L/min, 1 hr). Real Time (RT)-PCR, cell culture and bioassay to assess the infectivity	PEDV was detected in all particle sizes and in higher quantities than other searched viruses. All positive samples infectious.	Alonso et al., 2015 [62]
	PEDV	Nonhealthcare setting (USA), namely 9 swine or poultry farms: 16 air samples (12 and 4 collected from inside and outside, respectively)	Two different air samplers: Andersen cascade impactor separating particles into 8 size intervals (28.3 L/min, 1 hr) and Tisch cascade impactor separating particles into 4 size intervals (1130 L/min, 30 min). Real time (RT)-PCR	69% positive samples for PEDV. Inside samples more often positive. Highest PEDV concentrations in larger particles.	Alonso et al., 2017 [63]
Common Human CoVs	229E/NL63 and OC43/HKU1	King Abdul Aziz International Airport, Pilgrims City (Jeddah, Saudi Arabia): 40 surfaces and 18 air samples	Liquid SKC biosampler using buffered solution with bovine serum albumin as collection fluid (6 L/min, 2 hr). Respiratory multiplex array	One air sample (1/18, 5.5%) positive for viral presence. 3/7 surfaces samples positive for HCoV-OC43/HKU1.	Memish et al., 2014 [66]
	HCoV	Healthcare setting (USA): 48 air samples (24 for each type of air sampler) from the patient waiting areas in the emergency department of a pediatric hospital, a public primary care clinic, and a private primary care clinic.	Two different air samplers: liquid SKC biosampler using buffered solution with bovine serum albumin as collection fluid (8 L/min, 1 hr) and portable SKC filter cassette preloaded with PTFE filter (5 L/min, 3 hr). Real time (RT)-PCR and cell culture.	16 (33.3%) of the 48 samples positive at least for 1 respiratory pathogen, but no infectivity. No positivity for coronavirus.	Nguyen et al., 2016 [68]

	HCoV	Nonhealthcare settings (Malaysia), namely farms (11), abattoirs (2), and animal markets (3): 78 worker nasal wash samples, 55 pig feces, 49 pig oral secretion, and 45 air samples.	NIOSH bioaerosol sampler separating particles into 3 size intervals (3.5 L/min, 30 min). Real time (RT)-PCR.	HCoV was detected in 2.6% of worker nasal wash but no in the others animal and environmental samples.	Borkenhagen et al., 2018 [64]
	HCoV	Singapore Mass Rapid Transit heavy rail lines (Singapore): 89 air samples	NIOSH bioaerosol sampler separating particles into 3 size intervals (3.5 L/min, 3 hr). Real Time (RT)-PCR, cell culture and sequencing	14 (16%) of the aerosol samples positive for one or more viruses. No positive samples for coronavirus	Coleman et al., 2018 [65]
	HCoV	General paediatric ward at KK Women's and Children's Hospital (Singapore): 28 air samples	NIOSH bioaerosol sampler separating particles into 3 size intervals (3.5 L/min, 4 hr) and SKC filter cassette preloaded with 0.3-μm pore size PTFE filter (3.5 L/min, 4 hr). Real time (RT)-PCR and cell culture	8 (28.5%) samples positive for adenovirus and one (3.5%) for influenza A virus, but no infectious. HCoV was not found.	Yadana et al., 2019 [69]
	229E and OC43	University campus (Hong Kong): 1028 air samples	NIOSH bioaerosol sampler separating particles into 3 size intervals (3.5 L/min, 30 min). Real time (RT)-PCR and cell culture for positive samples.	Influenza genome was the most detected (20.6% of total samples). HCoV was not found.	Xie et al., 2020 [67]
SARS-CoV		Room with positive patient in the Chang Gung Memorial Hospital (Taiwan): 12 air samples and 3 unexposed filters.	Sampling filter cassette with a 1-μm PTFE filter (4.5 L/minute, 8 hr). Moreover, 0.023-μm and 0.3-μm HEPA filters connected to breathing circuit for filtration efficiency tests (4.5 L/minute, 20 minutes). Real time (RT)-PCR	All samples negative. HEPA filters with a pore size of 0.023 μm could remove 100% of aerosolized virus.	Tsai at al., 2006 [71]
		Healthcare setting (Taiwan): - 6 air samples from negative pressure hospital isolation room; - 3 air samples from each filter during experimental tests for filtration efficiency.	Sampling filter cassette with a 1-μm PTFE filter were collected from a patient isolation room (4.5 L/min, 20 min). Real time RT-PCR	None of the air samples positive for SARS-CoV genome. PCR positive rates of the filters were 100%.	Wan et a., 2004 [72]
		SARS units of four Toronto healthcare facilities (Canada): 38 air (10 wet air samples and 28 dry air samples) and 85 surfaces samples collected from 19 rooms.	Wet air sampling: High-resolution slit-sampler system impinger using buffered solution with bovine serum albumin as collection fluid (30 L/min, 18 min). Dry air sampling: 0.3-μm PTFE membrane filter in disposable plastic cassette (2 L/min, 18 min). RT- PCR, real time RT-PCR, and cell culture.	2 wet air samples and 3 surface samples (bed table, television remote control and medication refrigerator door) positive. None infectious.	Booth et al., 2005 [70]

MERS-CoV	Healthcare setting (South Korea): 7 air and 68 surfaces samples from 2 rooms of infected patients in hospital A and 1 room patient in hospital B	MD8 airscan sampling device with 3-μm pore size sterile gelatin filters (50 L/min, 20 min). RT-PCR and isolation on cells. Electron microscope and immunofluorescence assay	All air samples positive and 4/7 infectious. 42/68 swab samples positive by RT-PCR and sequencing.	Kim et al., 2016 [74]
	Camels' barn (Saudi Arabia): 3 air samples from the site where a worker became ill	MD8 airscan sampling device with 3-μm pore size sterile gelatin filters (50 L/min, 20 min). Real time RT-PCR and sequencing	Only one air sample positive and the genome sequences were identical to those from the animal and from the infected worker.	Azhar et al., 2014 [73]
SARS-CoV-2	Healthcare setting (Hong Kong): 8 air samples and 13 various environmental samples in the room of the first confirmed case in Hong Kong	SAS Super ISO 180 equipped with culture plate containing viral transport medium (180 L/min, 5 min). RT-PCR.	All air samples negative. Only the window bench surface positive before the collection of air samples.	Cheng et al., 2020 [77]
	ICU at Imam Khomeini Hospital complex (Iran): 10 air samples in patients' rooms	Liquid impinger using viral growth media as collection fluid (1.5 L/min, 1 hr). Real Time RT-PCR	All air samples negative	Faridi et al., 2020 [78]
	ICU and general COVID-19 ward (China): 56 air samples collected from different sites (i.e. near the air outlets, inside patient's room, in the doctors' office area) and 369 surface samples from objects frequently touched by medical staff or patients (i.e. computer mice, trash cans, doorknobs)	SASS 2300 Wetted Wall Cyclone Sampler (300 L/min, 30 min). Real Time RT-PCR	RNA detected in all the sampling sites, with the highest frequency near the patients (44.4%) and at the air outlets (35.7%).	Guo et al., 2020 [75]
	Healthcare setting (China): 35 air samples collected with different sampling methods in two designated hospitals and public areas in Wuhan	Sampling on presterilized gelatin filters (pore size 3 μm) with three methods: - Aspiration using Casella portable pump (5 L/min, 5-20 hr) for aerosol samples of total suspended particles (30); - Miniature SKC cascade impactor (9 L/min, 5-20 hr) for aerodynamic size-segregated aerosol samples (3); - Gelatin filter packed in a holder with an effective deposition area of 43 cm^2 (exposed for 7 days) for aerosol deposition samples (2) Droplets digital PCR.	Highest level contamination in the toilet area. Positive samples in the medical staff area and low contamination in public area outside. RNA was found in submicron region and supermicron region aerosol size.	Liu et al., 2020 [76]

	Healthcare setting (Singapore): 6 air samples from three AIIRs and 38 surfaces samples (surface inside the room and personal protective equipment used by medical staff)	SKC filter cassette preloaded with 0.3-μm pore size PTFE filter (5 L/min, 4 hr) in the room and anteroom. Sartorius MD8 microbiological sampler with gelatin membrane filter (6 L/h, 15 min) outside the room.	Only surface samples were positive, including 13/15 (87%) room surface sites and 3/5 (60%) toilet surfaces before routine cleaning resulted positive.	Ong et al., 2020 [79]
	Healthcare setting (Singapore): 3 air samples from AIIRs of general ward and 245 surfaces samples from hospital rooms of COVID-19 patients.	NIOSH BC 251 bioaerosol sampler separating particles into 3 size intervals (3.5 L/min, 4 h). In one patient room, additional sampling with SKC filter cassette preloaded with 0.3-μm pore size PTFE filter (5 L/min, 4 h). RT-PCR and real time RT-PCR	Air samples from two (66.7%) of AIIRs resulted positive in particle sizes > 4 μm and 1–4 μm. Rooms with contaminated air had also surface contamination.	Chia et al., 2020 [80]
	Industrial site of Bergamo Province (Italy): 34 PM10 samples from the outdoor air	Low-volume gravimetric air sampler (38.3 L/min, 24 hr). Real time RT-PCR procedure for three gene markers.	20 positivity for at least one of the three marker genes.	Setti et al., 2020 [81]

AIIRs = airborne infection isolation rooms; HCoV = Human Coronavirus; ICU = intensive care unit; PEDV = Porcine Epidemic Diarrhea Virus; PRCoV = Porcine Respiratory Coronavirus; PTFE = polytetrafluoroethylene; NIOSH = National Institute for Occupational Safety and Health

Table S3. Epidemiological studies taking into consideration aerosol transmission, classified according to the type of coronavirus

Disease	Place, Year, Setting Case Number	Study Type	Results	Ref.
SARS Community outbreaks	Hong Kong, 2003 Amoy Garden apartments 321 cases	Epidemiological retrospective and fluid-dynamic analysis	The epidemiological findings were consistent with the origin from the plume of warm contaminated air in an air shaft from a toilet	Yu et al., 2004 [84]
		Multizone airflow model	Cases concentrations in flats predicted with the use of multi-zone modeling	Li et al, 2005 [85]
		Clinical and virological analysis of patients	Nasopharyngeal viral load higher in patients living in adjacent units to index patient	Chu, et al. 2005 [86]
		Analysis of meteorological variables 6 days before outbreak	Marked decrease of temperature and temperature range permissive for virus survival	Yip et al, 2007 [87]
		Gas tracer to show air flux	Exhaust air coming out from a window of a floor that re-enters in open window at the immediate upper floor.	Niu & Tung, 2008 [88]
		Computational fluid dynamic technique	Wind influence the upward transport between flats	Gao et al, 2008 [89]
		Eulerian-Lagrangian models	1 m particles dispersed like a. gas, while the ones of 20 m or more settled close to the source	Gao et al. 2009 [90]
		Temporal and spatial description of the outbreak including nearby residences	The airborne spread (till 200 m) was the most probable explanation for cases around the Amoy Garden complex,	Yu et al., 2014 [91]
	Honk Kong, 2003 Aircrafts (3 flights) 0/315; 22/120; 1/246 cases	Descriptive	In the second aircraft 7 infected farer than three rows (2.3 m) from the index case	Olsen et al. 2003 [92]
		Eulerian-Lagrangian model	Passengers movements can influence the airborne transmission	Han et al. 2014 [93]
		Multi-route transmission model	Estimated airborne component: 21% (95% CI: 19%-23%)	Lei at al., 2018 [94]
		Simulation of different ventilation systems	Effectiveness in controlling cabin contaminant transport resulted higher for conventional displacement ventilation system	You et al., 2019 [95]
	Hong Kong, 2003 Hotel Metropole	Epidemiological investigation and environmental samples	Infected people were from the same floor and probably passed in front of the room of the index case (n.911).	CDC, 2003 (detailed

	17 + related cases in Canada, Hong Kong, Singapore, and Viet Nam		Positive environmental samples were taken from the air inlet of the recirculating elevator lobby fan on the 9th floor and also from outside guest rooms 908, 909, 910, and 911 (carpet, door sills, etc.).	by WHO, 2006) [96]
SARS Nosocomial Outbreaks	Toronto (Canada), 2003 Hospital 128 cases	Epidemiological investigation	Lowest risk for distance from the index case > 3 m, but one infected at 5 m	Varia et al., 2003 [98]
	Toronto (Canada)	Case report	Case study of possible airborne transmission in a cardiopulmonary resuscitation despite the use of contact and droplet precautions	Christian et al, 2004 [99]
	Hong Kong, 2003 Hospital 138 cases	Retrospective cohort study on medical students, study on the air ventilation system and aerosol diffusion modelling	The highest relative risk was for distance < 1m from the index case, but some people was infected also for at higher distances, in the same room. Ventilation study and aerosol simulations gave results compatible with the airborne transmission but were incomplete.	Wong, et al., 2004 [101]
		Ventilation study of airflow pattern, modelled with the computational fluid dynamics technique using CO_2 as a marker	Authors found an imbalance between supply and exhaust airflows, predicted bio-aerosol concentration Air distribution in the ward seemed to agree fairly well with the spatial infection pattern of SARS cases.	Li, et al., 2005 [100]
		Retrospective cohort study on inpatients, study on the air ventilation system and aerosol diffusion modelling	The attack rate decreased with the increasing distance from the index case. This agreed with the aerosol models results	Yu et al., 2005 [102]
		Multi-zone model combining the two-way airflow effect was validated using experimental tests	Air exchange owing to temperature difference played a significant role in SARS transmission during the nosocomial outbreak	Chen et al., 2011 [103]
		Multi-agent mathematical model to simulate the infection risk distributions of close contacts, airborne and fomite transmission.	The ways of spreading that resulted most probable to explain the epidemiological data were combined long-range airborne and close contact route.	Xiao et al., 2017 [104]
MERS	Republic of Korea, 2015 Hospital 11 cases	Multi-agent mathematical model to simulate the infection risk distributions of close contacts, airborne and fomite transmission.	The ways of spreading that resulted most probable to explain the epidemiological data were combined long-range airborne and close contact route	Xiao et al., 2018 [105]

	Republic of Korea, 2015 Hospital 30 cases	Computational fluid dynamics to analyze the indoor airflow and passive tracer diffusion	The tracer diffusion indicated a concentration in the ward where cases occurred although far from the ward of index pathogen	Jo et al., 2019 [106]
COVID-19	Mongolia, 2020, 1 case Wuhan (China), Jinyintan Hospital, 4 cases	Case reports	1 person living upstairs the index case 4 laboratory technicians	Wang & Du, 2020 [107]
	South Korea, 2020 Call center, 97 cases	Epidemiological investigation	Possible diffusion in crowded office settings such as a call center	Park et al., 2020 [108]
	Wenzhou (China), 2020 Shopping mall 23 + 11 related cases	Epidemiological investigation	Some customer had no contacts with index case. Indirect transmission through fomites or aerosol supposed	Cai et al, 2020 [109]
	Skagit County (Washington), 2020 Choir practice 32 + 20 related cases	Epidemiological investigation	Singing at small distance for 2.5 hours caused close contacts. Aerosol was one of possible ways of transmission	Hammer et al., 2020 [110]
	Munich (Germany), 2020 Meeting 11 cases	Epidemiological investigation	Hand shaking, aerosolization in relatively small room that was heated by conventional radiators, and face-to-face contact have been supposed as relevant modes of transmission	Hijnen et al., 2020 [111]
	Guangzhou (China), 2020 Restaurant 10 cases	Epidemiological investigation and environmental sampling	A strong airflow from the air conditioner could have propagated aerosol to a distance greater than 1m. Environmental samples were negative	Lu et al., 2020 [112]
	California (USA), 2020 Nosocomial 3 cases	Contact tracing	A patient with respiratory symptoms was hospitalized, but COVID-19 was not suspected, so HCWs did not wear PPE. Three HCWs get laboratory-confirmed COVID-19 and they came in contact with index case, including performance/ assisting with aerosol-generating procedures	Heinzerling et al., 2020 [113]
	Hong Kong, 2020 Nosocomial Only index case	Contact tracing and surveillance	A patient stayed in a ward with only general precaution before diagnosis of COVID-19. None of HCWs or patient came in contact with her get infection, thus confirming the importance of general precaution and PPE	Wong et al., 2020 [114]

HCWs = healthcare workers; PPE = personal protective equipment