Supplementary materials

Table 1. Study outcome and intervention summary for aerosol contamination mitigation and transmission

No	Article Title	Research Method	Sample	Intervention or exposure	Research Results
	Personal Protective Equipment				
1	Maclntyre et al (2014)	Randomized Controlled Trial (RCT)	Hospital healthcare workers	N95 respirators and medical masks	Both medical masks and respirators are effective in reducing bacterial colonization and co-infection in the upper respiratory tract among healthcare workers.
2	Asadi et al (2020)	Experimental study	10 volunteers (6 male and 4 female, aged between 18 to 45 years	Surgical masks, KN95 respirators	Surgical masks and unvented KN95 respirators reduce outward particle emission by 90% and 74%, respectively, during speaking and coughing without fit testing.
3	Sterr et al (2021)	In vitro experimental study	Dummy head	Cloth masks, non-certified face masks, certified medical face masks, respirator masks (KN95)	The medical face masks effectively protect the wearer from exposure to aerosols, showing the importance in reducing the risk of respiratory infections.
4	Armand et al (2022)	Laboratory experimental study	Anatomical replica of adult upper airways	Medical face masks	Medical face masks do not significantly compromise bacterial filtration efficiency or breathability, supporting the use as a protective measure without substantial hindrance to breathability.
5	Weng et al (2022)	Experimental study	Healthcare workers	Full-face mask	The use of a full-face mask offers a high level of protection against respiratory infections, suggesting the potential as a reliable preventive measure.
6	J.Liu et al (2022)	Experimental simulation study	A human body model of 1.7 m tall and 0.6 m wide, with 310 mm2	Cotton face masks, Surgical face masks, N95 face masks	The virus-carrying droplet concentration in a ventilated room decreases significantly with cotton face masks (201 times), surgical face masks

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			mouth opening, placed in the room is 12 m × 8 m × 3 m.		(43,786 times), and N95 face masks (307,060 times).
7	Han et al (2023)	Experimental simulation study	Surgical mask with filtration efficiency bench, pressure drop test bench, and schematic of filtration efficiency test bench	Surgical mask	The melt-blown layer is more efficient (0.1–2.0 μm particles), but both layers are ineffective (<30%) for particles <0.3 μm. Filtration efficiency is determined by layer structure and count.
	Nebulizer disinfection, drying, and replacement				
8	Towle et al (2013)	In vitro experimental study	Home nebulizers inoculated with bacterial respiratory pathogens	Baby bottle steam sterilizers	The results support that the use of baby bottle steam sterilizers is effective for nebulizer disinfection.
9	Lopes et al (2015)	Non-Random Experimental study	Mechanically ventilated tracheostomized patients	Ozone and ultrasound disinfection	The application of ultrasound reduced contamination levels by 4 log10, while only ozone and two other combined methods and peracetic acid reduced contamination levels by 5 log10.
10	Towle et al (2016)	In vitro experimental study	Home nebulizers inoculated with non-tuberculous mycobacteria	Baby bottle steam sterilizers	The use of baby bottle steam sterilizers for disinfecting home nebulizers is effective in eliminating bacterial pathogens.
11	da Costa Luciano (2016)	Experimental study	Traditional biofilm on endoscopy	Different detergents and disinfectants	Detergent and disinfectant combo reduced *E. faecalis* and *P. aeruginosa* in biofilm by 3-5 log10 CFU/cm2. Flexible endoscope biofilm is

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					hard to fully remove with detergents or disinfectants.
12	Hohenwarter et al (2016)	In vitro experimental study	Cystic fibrosis nebulizers	Various steam disinfection protocols	All bacteria tested were killed efficiently by different steam methods, but the risk of contamination depended on the drying method.
13	Rodney et al (2016)	Experimental study	Tracheostomy tubes	Reprocessing	Reprocessing PVC Tracheal Tubes, specifically for 20 cycles, unexpectedly increases *S. aureus* biofilm development, due to surface degradation facilitating bacterial attachment.
14	Manor et al (2017)	Non-Random experimental study	Airway clearance devices used by CF patients	Cleaning and infection control protocols (Hot clean water and detergent)	Complete eradication of bacteria was achieved in 15 (50%) samples and partial eradication in 9 (30%). Cleaning was completely ineffective in 4 samples.
15	Caskey et al (2018)	In vitro experimental study	*Mycobacterium abscessus*	Hospital biocides: 1) Acetone, 2) Propan-2-ol, 3) Diethylene glycol, 4) 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one, 5) Chlorine dioxide, 6) 4% chlorhexidine, 7) Alcohol, 8) Disodium carbonate	One of 13 *M. abscessus* cultures was killed with Chlorine Dioxide™ and another with Sodium Dichloroisocyanurate. Two isolates were killed by Alcohol. *M. abscessus* can survive after exposure to several biocides commonly used in hospitals.
16	Towle et al (2018)	In vitro experimental study	Home nebulizers	Ozone disinfection (SoClean®)	Ozone disinfection (SoClean®) effectively killed >99.99% of bacteria tested including *Pseudomonas*

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					aeruginosa and *Staphylococcus aureus*. Repeated ozone exposure for more than 250 hours did not change nebulizer output.
17	Collins et al (2019)	In vitro experimental study	115 de-identified respiratory Cystic Fibrosis isolates	Disinfection method: boiling H2O for 20 min, 3.0% hydrogen peroxide soak for 30 min, or 70% ethanol soak for 5 min	Preliminary results showed successful disinfection (n=10) across all tested isolates using the three methods. No discernible differences in efficacy between disinfection methods.
18	J.E Moore et al (2020)	In vitro experimental study	Cystic fibrosis patients	Nebulizer drying	Effective nebulizer drying eliminates detectable *P. aeruginosa*. Inadequate drying retains significant *P. aeruginosa* quantities.
19	J.Moore & Millar (2020)	In vitro experimental study	*Mycobacterium abscessus* complex	Nebulizer drying	24-hour room temperature drying does not fully remove *M. abscessus* from plastic surfaces, even with sputum. Drying helps nebulizer performance but is not a guaranteed NTM eradication method.
20	J.E Moore & Millar (2020)	Experimental study	*Staphylococcus aureus* (MSSA and MRSA)	Nebulizer drying	MSSA and MRSA were susceptible to drying. Implications for cystic fibrosis nebulizer hygiene.
21	Hutauruk et al (2021)	Randomized controlled trial (RCT)	Tracheostomy cannulas	Chlorhexidine decontamination	The study showed a significant reduction of biofilm colonies in the tracheal cannula washing group vs. control.
22	J.Moore & Millar (2022)	In vitro experimental study	*Mycobacterium abscessus* complex organisms	Ultraviolet-c (UVc) light and ozone	UV-C (254 nm) eradicated all bacteria, including challenging *M. abscessus* complex. O3 treatment

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					inactivated only 20% of isolates.
23	Pineau et al (2022)	In vitro experimental study	Semi-critical devices	UV disinfection process, FDA-cleared sterilants	UV disinfection for 35 seconds has higher sporicidal efficacy compared with chemical sterilization agents. UV is much more effective than FDA-approved chemical HLD products at killing spores.
24	Ibáñez-Cervantes et al (2023)	In vitro experimental study	ESKAPE bacteria biofilms on medical devices	Ozone disinfection	Ozone showed bactericidal effects on biofilms: 12 min/7.68 ppm for *A. baumannii* and *C. freundii*, and 15 min/9.60 ppm for *P. aeruginosa, K. pneumoniae,* and *S. aureus*.
	Additional devices				
25	Hu et al (2015)	In vitro experimental study	A lung model	Bacterial filter	The filter effectively prevents aerosol contamination. However, using aerosolized 10% acetylcysteine raises bacterial filter pressure during mechanical ventilation. Monitoring is necessary to address this concern.
26	Phu et al (2020)	Experimental study	Health care workers	Portable negative pressure hood with HEPA filtration	An analysis using fluorescein particles on HCWs' personal protective equipment showed that negative pressure reduced particle deposition both inside and outside the hood.
27	O'tolle et al (2020)	Experimental study	A critical care mechanical ventilator of an adult patient	Protective filter and a pleated hydrophobic filter (PHF), the Pall Breathing Circuit Filter	Higher fugitive aerosol concentrations in the vicinity, specifically with larger tidal volumes (0.077 (0.073, 0.091) mg m–3 at Vt = 820 mL vs. 0.062 (0.056, 0.065)

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					mg m–3 at Vt = 270 mL) when no filter was used.
28	Mac Giolla Eain et al (2022)	Experimental study	Aerosol therapy	Bacterial filter	Using a bacterial filter decreased aerosol release by 47.3–83.3% at different distances. Filter on the mouthpiece significantly reduced aerosol levels during therapy ($p \leq 0.05$).
29	Sugget & Nagel (2022)	Experimental study	Nebulizer therapy	Nebulizer filter kit	The BAN™ Nebulizer, with a filter kit, eradicated all losses as per previous reports of under 3% environmental losses for this device. Meanwhile, the other two nebulizers still emitted minor aerosol amounts despite using a filter kit.
	Environmental cleaning				
30	Franke et al (2021)	Experimental study	Surrogates for SARS-CoV-2	Automated room disinfection system using ozone	The ozone-based decontamination device effectively reduced both surrogate organisms (>4 log10 reduction) on various surfaces and positions, demonstrating high efficacy.
31	Trinh et al (2021)	Experimental study	*E. coli* and the biological indicator of spores (*Geobacillus stearothermophilus*)	Chlorine dioxide (ClO2) gas disinfectant	On-site disinfection tests in a hospital's Mycobacterium Tuberculosis Laboratory effectively eliminated *E. coli* and 2 of 5 G.
32	Xia et al (2022)	Experimental study	Mechanically ventilated space	Far-ultraviolet (far-UVC) with 222 nm for environmental disinfection	Far-UVC (222 nm) effectively neutralizes exhaled bioaerosols. Lab trials used *E. coli* as a representative, released from a manikin in a ventilated chamber.

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33	Nunayon et al (2022)	Experimental study	Aerosolized *Escherichia coli*	Rotating upper-room UVC-LED irradiation device	Rotating UVC is 70.5% better than stationary UVC in poor mixing. Rotating irradiation is 84.6% more efficient for long-range disinfection in the same setup. UV dose of 0.59-1.34 J/m2 achieves one-log *E. coli* inactivation.
34	Lu et al (2023)	Experimental study	Aerosolized bacteria, bacteriophage	Far-UVC (222-nm) and negative air ions	Far-UVC (222-nm) effectively deactivated bioaerosols, either used alone or in combination. Aerosolized viruses P22 and Phi 6 were more susceptible to 222-nm radiation from KrCl excilamp than negative air ions.
35	Wang et al (2023)	Experimental study	Airborne microorganisms in a full-scale chamber	222-nm Far-UVC upper-room system	222-nm Far-UVC decay rates and Z-values for bacteria—0.157, 0.974, 1.18 m2/J. Gram-positive (*S. epidermidis*) is more resistant than gram-negative (*E. coli, S. enterica*).
36	Sottani et al (2023)	Experimental study	The different environments in the hospital	UV-C air treatment and ozone (OZY AIR+LIGHT)	Using UV-C and ozone reduced pathogens by 2-log10, except Clostridioides spp. C. difficile prevention involves a combo of chemical methods and disinfectants.
37	Z. Liu et al (2023)	Experimental study	Simulated a practical process of an infected person contaminating an isolated room	Single ozone disinfection and the combination of ozone with ultraviolet (UV) lamp disinfection	Ozone <60 ppb had no effect on Serratia marcescens disinfection. Both UVC lamp types are equally effective for *S. marcescens* and phi-X174, improving air disinfection significantly.