

REALIGNING CONVENTIONAL ROUTES OF TRANSMISSION; OCCUPATIONAL EXPOSURE

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Review

Realigning the conventional routes of transmission: an improved model for occupational exposure assessment and infection prevention

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SUMMARY

Current recommendations for standard and transmission-based precautions in place for patients who are suspected or known to be infected or colonized with infectious agents are best suited to prevent the transfer of micro-organisms to other patients – that is, to prevent the acquisition of a healthcare-associated infection, rather than to protect the healthcare worker from self-contamination resulting in a potential occupationally

[https://www.journalofhospitalinfection.com/article/S0195-6701\(20\)30110-9/pdf](https://www.journalofhospitalinfection.com/article/S0195-6701(20)30110-9/pdf)

Summary

Current standard and transmission-based precautions are in place moreso for patient infection prevention than *occupational* infection prevention

Focus is on preventing healthcare associated infections (HAIs) not occupationally acquired infections (OAIs)

Guidance overlooks contact and aerosol precautions for risk of exposure from patient to worker

Need better controls for worker protection in healthcare

Exposure Risk

More occupational illnesses and infections in healthcare than in any other industry (BLS 2018)

82% of all blood and body fluid exposures are mucocutaneous (EPINet 2018)

Of those only 63.5% of employees indicate they are wearing PPE during the incident

57.6% to eyes, 6.4% wearing eye protection

Current Infection Prevention Focus



Transmission-based and standard precautions (CDC, HICPAC, APIC, SHEA) all focused on preventing transmission of microorganisms from worker, environment, instruments, patient care items TO PATIENT



Prevention of Healthcare Associated Infections (HAIs); nosocomial

Methods

PubMed, Google Scholar search

Conventional and alternative transmission routes for infectious diseases at risk of causing occupationally acquired infections (OAI)

Contact, droplet, airborne | discrepancies in mechanisms as we see today with SARS-CoV-2

Large versus small particles; hang in air and settle or travel long distances?

Droplet precautions; faceshields, respirators, masks?

Alternative Paradigms



Direct, indirect, droplet

Rather than contact, droplet, airborne (Brune, Edling)



Aerosol

Rather than droplet and airborne (Jones, Brosseau)



Proposal is to reject particle size and distance, rather focusing on exposure hazards

Contact
(mucocutaneous, percutaneous)
Aerosol (infectious particles in air)

Simplification of Controls for OAs



Contact and Aerosols



Based on Routes and Risks of Exposures



Based on Hazard Assessment of Procedures, Processes



Based on Hierarchy of Controls



Not specific transmission routes of myriad of microorganisms



Less distraction about whether pathogens can or will survive at whatever particle size in droplets, aerosolized, direct, indirect, etc.

Most effective

Order of implementation

Least effective

Level	Example control	Useful for contact exposures	Useful for aerosol exposures
Elimination <i>Removes hazard entirely</i>	Telemedicine services to obviate need for some patients to enter the healthcare workplace	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Substitution <i>Uses less or non-hazardous alternative</i>	Blunt-tip sutures instead of sharp sutures to close internal fascia	<input checked="" type="checkbox"/>	
	Adhesives, strips, zipper closures or staples for other suturing applications	<input checked="" type="checkbox"/>	
	Alternative cutting devices, such as electro-surgical pencils	<input checked="" type="checkbox"/>	
Engineering controls <i>Isolate workers from hazards or place physical barriers between workers and hazard</i>	Physical barriers separating staff from patients in triage areas	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Negative-pressure, airborne infection isolation rooms with high-efficiency particulate arrestance (HEPA)-filtered exhaust air		<input checked="" type="checkbox"/>
	Closed circuit audio/visual communication between staff and patients in isolation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Sharps with injury protection (SIPs), including retracting blades and syringes	<input checked="" type="checkbox"/>	
	Needleless intravenous catheters/connectors	<input checked="" type="checkbox"/>	
Administrative controls and safe work practices <i>Change how workers perform their duties</i>	Neutral zone/no-hands passing	<input checked="" type="checkbox"/>	
	Activating safety features on SIPs	<input checked="" type="checkbox"/>	
	Rest periods to reduce fatigue (time outs)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Training staff to work safely	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Situational awareness (communicating about exposure hazards)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PPE <i>Items worn to prevent exposures that cannot be controlled through other means</i>	Barrier protection (single, double, and/or heavy-duty gloves; protective eyewear or face shields; gowns, coveralls and other protective garments)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Appropriate respirators	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Protecting Yourself from COVID-19 in the Workplace // Safety and Health Awareness for Responders to the Coronavirus

Scenario	Approach under conventional, transmission-based precautions	Approach under alternative, exposure-based precautions
<p>Healthcare worker caring for a patient with adenovirus infection needs to empty human waste from bedside commode into the toilet in the patient room.</p>	<ul style="list-style-type: none"> – Hazard: adenovirus is considered a droplet-transmissible organism. – Exposure risk to workers: contact with contaminated environmental surfaces and fomites; exposure to droplets associated with transfer of waste from bedside commode to regular toilet. – Likely control measures: gown and gloves for all interactions that may involve contact with the patient’s environment. 	<ul style="list-style-type: none"> – Hazard: adenovirus, including in faeces, may contact mucous membranes; waste transfer may generate splashes and sprays; flushing toilet may create aerosol. – Exposure risk to workers: contact with contaminated environmental surfaces and fomites; exposure to droplets associated with transfer of waste from bedside commode to regular toilet; exposure to aerosol generated from toilet flush. – Likely control measures: gloves and gowns; appropriate face protection, including eye protection and/or a face shield (especially if there is also exposure to a hazardous chemotherapeutic or drug); NIOSH-certified N95 FFR or better respirator may also be warranted, as inhalation of adenovirus-containing aerosols can cause acute respiratory infection.