

Exposure and Risk Assessment Worksheet

Applying the Science on Air/Inhalation Transmission of Infectious Diseases to Protect Health Care Workers, Patients/Residents, and Others Present in Health Care Settings

Purpose of this worksheet: Use this worksheet to organize the available evidence and to determine the best way to educate and protect individuals in a healthcare setting. This could be the staff, patients, and visitors of an entire facility or you can use the worksheet for one unit such as the Emergency Department or a procedure room.

Target Audience or Users: Anyone can use this framework; however, it is specifically geared toward health care workers, unions, patients and their advocates/families, employers, managers, infectious disease committees, infection preventionists, and occupational health professionals.

Background: In the past, many pathogens (like viruses and other germs) were thought to be transmitted from person to person through the air. For decades, some of these aerosol-transmissible pathogens were thought to be transmitted as “droplets” from one person to another when an infected person coughed or sneezed and the droplets landed on the mucous membranes or in the nasal cavities of other people. It was not thought that these larger droplets were typically inhaled into the lungs.

Recently, significant progress has been made to advance recognition of more accurate scientific evidence on transmission of pathogens through the air, including the recent World Health Organization’s [*Global technical consultation report on proposed terminology for pathogens that transmit through the air*](#). The updated science indicates that pathogens emitted by an infected person when breathing, talking, and singing (in addition to coughing and sneezing) can be inhaled by other people at both near and far range distances from the infected person, resulting in spread of infection; this is called aerosol or inhalation transmission. This means that our approach to controlling the spread of many pathogens must be reassessed.

This document provides a tool to support individuals in a range of roles to begin to make the conceptual shifts needed to fully recognize inhalation transmission science. The document does not attempt to capture all related details or considerations; rather, it serves as a framework formulated by multiple experts.

Note: Where this form refers to “individuals present in health care settings,” we include health care workers, patients or residents, visitors, and anyone else who may be present in the setting. The form is focused on patient/resident-facing settings and does not include additional considerations for areas with specific risks for inhalation transmission such as hospital laboratories.

Section 1, Pathogen:

Does this pathogen (virus, bacteria, etc.) infect people through inhalation transmission?

This section provides a framework through which scientific evidence can be evaluated to assess the plausibility of transmission through the air via inhalation for a specific pathogen.

Any pathogen previously classified as droplet or airborne can be assumed to be transmissible through inhalation (proceed with Section 2).

If not, also consider the following:

<p>1. Is there evidence that the pathogen can be aerosolized?</p> <ul style="list-style-type: none"> • Via respiratory emissions (pathogen is present in the respiratory tract) • Via other bodily emissions that can result in aerosols (vomiting, diarrhea, etc.) • Via clinical procedures or tasks (pathogen is present in a site where aerosolization may occur, e.g., bronchoscopy, wound debridement, bed linen changes) 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No data available
<p>2. Is there evidence that the pathogen can survive in the air?</p> <ul style="list-style-type: none"> • Look at literature including lab studies 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No data available
<p>3. Is there evidence that inhalation of this pathogen can lead to infection in a susceptible individual?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No data available

All pathogens should be assessed for the possibility that they may spread through the air via inhalation. If the answer to one or more questions above is no, then the pathogen is not capable of transmitting through the air. A lack of evidence should not rule out the possibility of transmission through the air via inhalation. Otherwise proceed.

Section 2, Exposure and Risk Assessment:

If the pathogen is capable of being transmitted through the air and inhaled, conduct an exposure and risk assessment.¹

Proceed to Section 2 for pathogens previously characterized as droplet or airborne transmitted and where Section 1 evidence points to infection via inhalation.

Use the following factors as a guide to help determine the likelihood of staff, patients, and visitors being exposed and becoming infected after exposure to the pathogen (virus, bacteria, etc.). Note that this is not an exhaustive list; rather a starting point.

This assessment should inform selection of control measures in Section 3.

<p>4. Can individuals present in health care settings be exposed to aerosols containing the pathogen?</p>	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> No data available</p>
<p>5. How frequently and in what contexts might individuals present in health care settings encounter the pathogen?</p>	<ul style="list-style-type: none"> • When, where, and for how long are individuals exposed to aerosols containing the pathogen? • What specific tasks or procedures can generate higher concentrations of aerosols? • How infectious are the sources that are being encountered? (e.g., how much pathogen are they emitting into the air due to stage of infection, symptoms such as coughing, etc.)
<p>6. Does infection with the pathogen cause disease or other adverse impacts?</p> <ul style="list-style-type: none"> • If yes, what is the range and severity of disease the pathogen can cause, including for more vulnerable populations? • What other impacts might infection cause (e.g., missed work time, exposure/onward transmission to vulnerable individuals)? 	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> No data available</p>

¹ NOTE: Exposures to health care workers, patients/residents, and visitors will likely need to be considered separately given differing locations, tasks, and interactions.

Section 3: Hierarchy of Controls

If your assessment from Section 2 suggests that individuals present in health care settings are exposed to a pathogen that is transmitted via inhalation and there is risk of harm, select and implement effective control measures.

7. What principles and considerations can I draw on in selecting these measures?

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|---|---|
| <input type="checkbox"/> Precautionary principle | <input type="checkbox"/> Multiple measures together reduce risk more effectively than any one measure alone |
| <input type="checkbox"/> Protecting health care workers and patients from identified risks of harm | <input type="checkbox"/> Hierarchy of controls |
| <input type="checkbox"/> Preventing onward transmission of infectious diseases that can cause harm to individuals outside the health care setting | <input type="checkbox"/> Other: |

8. The control measures that would be effective at preventing exposure to individuals present in health care settings to this pathogen include: (select all that apply)

Hierarchy of Controls*	Prevention Measures	
Elimination Controls , in the context of patient care, are used to contain the hazard to prevent exposures.	<input type="checkbox"/> Patient screening	<input type="checkbox"/> Entry restrictions
	<input type="checkbox"/> Visitor screening	<input type="checkbox"/> Visitor restrictions
	<input type="checkbox"/> Paid sick leave	
Engineering controls are built or installed into the workplace to reduce or prevent exposure to workers.	<input type="checkbox"/> Ventilation and air cleaning	<input type="checkbox"/> Airborne Infection Isolation Rooms (AIIRs) used for patient isolation
	<input type="checkbox"/> Specialized equipment that contains and captures generated aerosols (e.g., sputum induction booth)	
Administrative controls establish work practices that reduce the duration, frequency, or intensity of exposure.	<input type="checkbox"/> Staffing	<input type="checkbox"/> Contact tracing
	<input type="checkbox"/> Patient isolation	<input type="checkbox"/> Mask/respirator use for source control
	<input type="checkbox"/> Vaccines	<input type="checkbox"/> Training
	<input type="checkbox"/> Exposure surveillance and notification	
Personal Protective Equipment (PPE) is worn to minimize exposure.	<input type="checkbox"/> Respirators	<input type="checkbox"/> Gowns and coveralls
	<input type="checkbox"/> Gloves	<input type="checkbox"/> Eye protection
* The hierarchy of controls is a framework to support consideration of different control options for different types of exposure. The goal of the hierarchy is not to demonstrate “effectiveness” of control measures—each control measure is effective at reducing a different risk and it is likely that controls from multiple levels will be needed together to reduce the risk of transmission. Rather, the goal of the hierarchy is to place more emphasis on controls that avoid placing an undue burden on workers to implement.		