

Engineering and Administrative Controls for Minimizing Infectious Disease Exposures in Healthcare Facilities in Kansas

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Controlling exposures to occupational hazards is a fundamental way to protect personnel. Traditionally, a [hierarchy of controls](#) approach has been used to achieve feasible and effective control. Some of the control measures may fall into multiple categories. It should also be emphasized that multiple control strategies can be implemented concurrently and or sequentially. This hierarchy can be represented as follows:

- Elimination
- Substitution
- Engineering controls – more details below
- Administrative controls – more details below
- Personal protective equipment (PPE) – see our guidance documents for alternatives and optimization strategies for PPE found on our Resource Center

To prevent infectious disease transmission, elimination (physically removing the hazard) and substitution (replacing the hazard) are not typically options for the healthcare setting. However, exposures to transmissible respiratory pathogens in healthcare facilities can often be reduced or possibly avoided through engineering and administrative controls and PPE. Prompt detection and effective triage and isolation of potentially infectious patients are essential to prevent unnecessary exposures among patients, healthcare personnel (HCP), and visitors at the facility.

Engineering Controls

Engineering controls reduce exposures for HCP by **placing a barrier between the hazard and the HCP**. Engineering controls can be very effective as part of a suite of strategies to protect HCP without placing primary responsibility of implementation on them (i.e. they function without HCP having to take an action). This set of controls should already be implemented in healthcare settings. In the continuum of surge capacity and standards of care, these measures can be categorized as [conventional capacity](#), which consists of providing patient care without any change in daily practices.

Ventilation engineering control examples:

- AIIR rooms, if available
- Expedient patient isolation rooms
- Ventilated headboards
- Appropriate filters and maintenance of ventilation systems

Physical engineering control examples:

- Glass/plastic windows (e.g., intake desk at emergency department, triage station, information booth, pharmacy drop-off/pick-up windows)
- Curtains between patients in shared areas
- Closed-suctioning systems for intubated patients

Administrative Controls

Administrative controls refers to employer-dictated **work practices and policies** that reduce or prevent hazardous exposures. Their effectiveness depends on employer commitment and HCP acceptance and consistent use of the strategies. Regular training, monitoring and reinforcement are necessary to ensure that policies and procedures are followed consistently. Many of these strategies should already be incorporated into existing infection prevention and control policies in healthcare settings. In the continuum of surge capacity and standards of care, the following administrative control measures can be categorized as [conventional capacity](#), which consists of providing patient care without any change in daily practices.

Limit number of patients going to hospital or outpatient settings

- Screen patients for acute respiratory illness prior to appointment (e.g., during reminder call, at entrance to building)
- Postpone/reschedule non-urgent appointments

Exclude HCP not directly involved in patient care

- Limit HCP in patient room to only those providing direct care
- Exclude non-essential staff from entry to patient rooms (e.g., dietary, EVS)

Limit face-to-face HCP encounters with patient

- Bundle care activities to limit room entry/exits
- Reduce close contact when able
- Tele-options (e.g., telephones, video monitoring, and video-call applications on cell phones or tablets)

Exclude visitors to patients with infectious disease

- Restrict visitors for rooms in which isolation precautions are needed
- Screen visitors upon entry and send ill visitors home
- Tele-options (e.g., telephones and video-call applications on cell phones or tablets)
- Exceptions for end-of-life situations or when visitor is essential to patient's emotional well-being and care – enforce PPE compliance from visitors and instruct on proper use and hand hygiene

Source control

- Quickly identify ill patients, instruct to wear facemask, and move to private room
- Teach appropriate hand hygiene
- If leaving room is a necessity, instruct to wear facemask

Cohorting

- Grouping patients together based on clinical diagnosis (same organism), microbiologic confirmation when available, epidemiology, and mode of transmission of the infectious agent
- Placed spatially near each other to confine care to one area
- If private rooms are not available, patients in same cohort can share rooms – NOTE: treat individual patient space as if it were a different room
- Designate staff to care for cohorted patients

Telemedicine

- Screen and manage patients
- Consultations
- Follow-up appointments

Education/Training Needed HCP on PPE Types and Use

- Indications for use
- Limitations and maintenance
- Donning/doffing
- Use expired supplies for training (if available)

Surge capacity refers to the ability to manage a sudden, unexpected increase in patient volume that would otherwise severely challenge or exceed the present capacity of a facility. While there are no commonly accepted measurements or triggers to distinguish surge capacity from daily patient care capacity, surge capacity is a useful framework to approach a decreased supply of PPE during a pandemic response. Three general strata have been used to describe surge capacity and can be used to prioritize measures to conserve PPE supplies along the continuum of care.

- Conventional capacity: measures consist of providing patient care without any change in daily contemporary practices. This set of measures, consisting of engineering, administrative, and PPE controls should already be implemented in general infection prevention and control plans in healthcare settings.
- Contingency capacity: measures may change daily contemporary practices but may not have any significant impact on the care delivered to the patient or the safety of the HCP. These practices may be used temporarily when demands exceed resources.

- **Crisis capacity:** alternate strategies that are not commensurate with contemporary U.S. standards of care. These measures, or a combination of these measures, may need to be considered during periods of expected or known PPE shortages.

Decisions to implement measures in contingency capacity and then crisis capacity should be based on:

- Consideration of all conventional capacity strategies first.
- The availability of PPE.
- Consultation with local healthcare coalitions, federal, state, or local public health partners. Even when state/local coalitions or public health authorities can shift resources between health care facilities, these strategies may still be necessary.

References:

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