

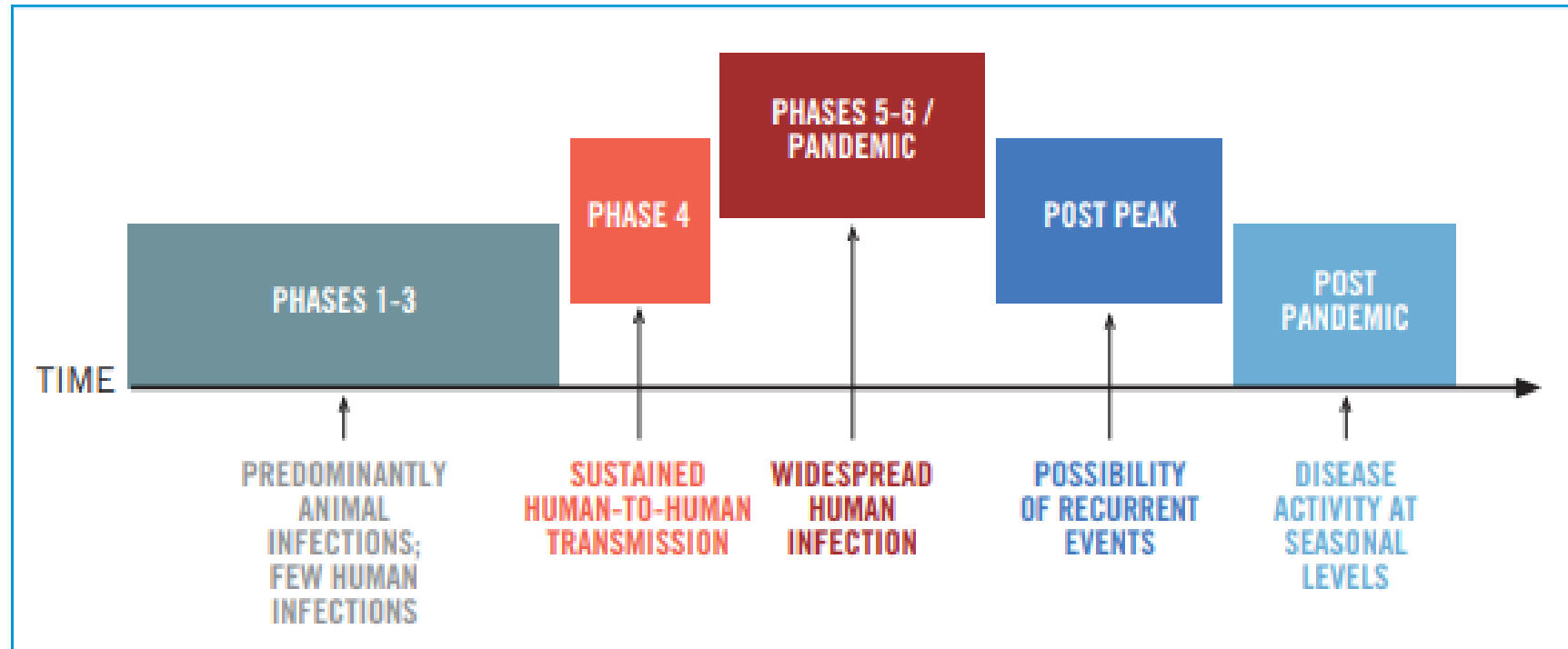
Hospital Epidemiology  
and Infection Prevention

Pandemic Response and  
Management Framework

Perioperative and  
Procedural Areas



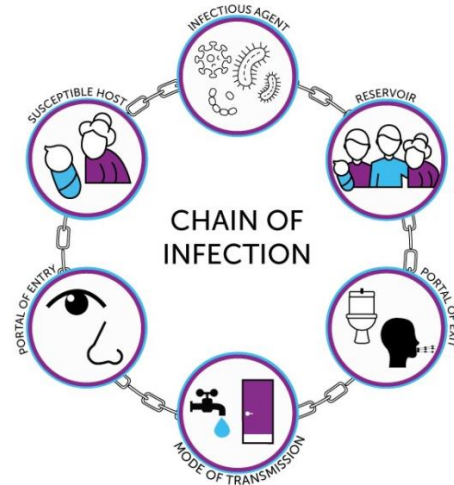
# WHO Pandemic Phases



[https://www.ncbi.nlm.nih.gov/books/NBK143062/pdf/Bookshelf\\_NBK143062.pdf](https://www.ncbi.nlm.nih.gov/books/NBK143062/pdf/Bookshelf_NBK143062.pdf)

**\*\*These phases are NOT designed to predict what will happen during a pandemic, and these phases will not always proceed in numerical order.**

# Occupational Risk Pyramid: Respiratory-Transmissible Diseases



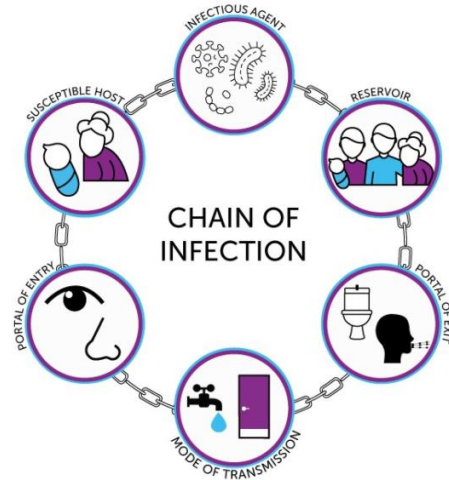
## Very high exposure risk:

- Healthcare employees (such as doctors, nurses, dentists, and other clinical staff) performing aerosol-generating procedures on known or suspected source patients
- Healthcare or laboratory personnel collecting or handling specimens from known or suspected source patients (for example, manipulating cultures from known or suspected source patients).

## High exposure risk:

- Healthcare delivery and support staff exposed to known or suspected source patients (for example, doctors, nurses, and other hospital staff that must enter patient's care area).
- Medical transport of known or suspected source patients in enclosed vehicles (for example, emergency medical technicians).
- Performing autopsies on known or suspected source patients (for example, morgue and mortuary employees).

# Occupational Risk Pyramid: Contact-Transmissible Diseases



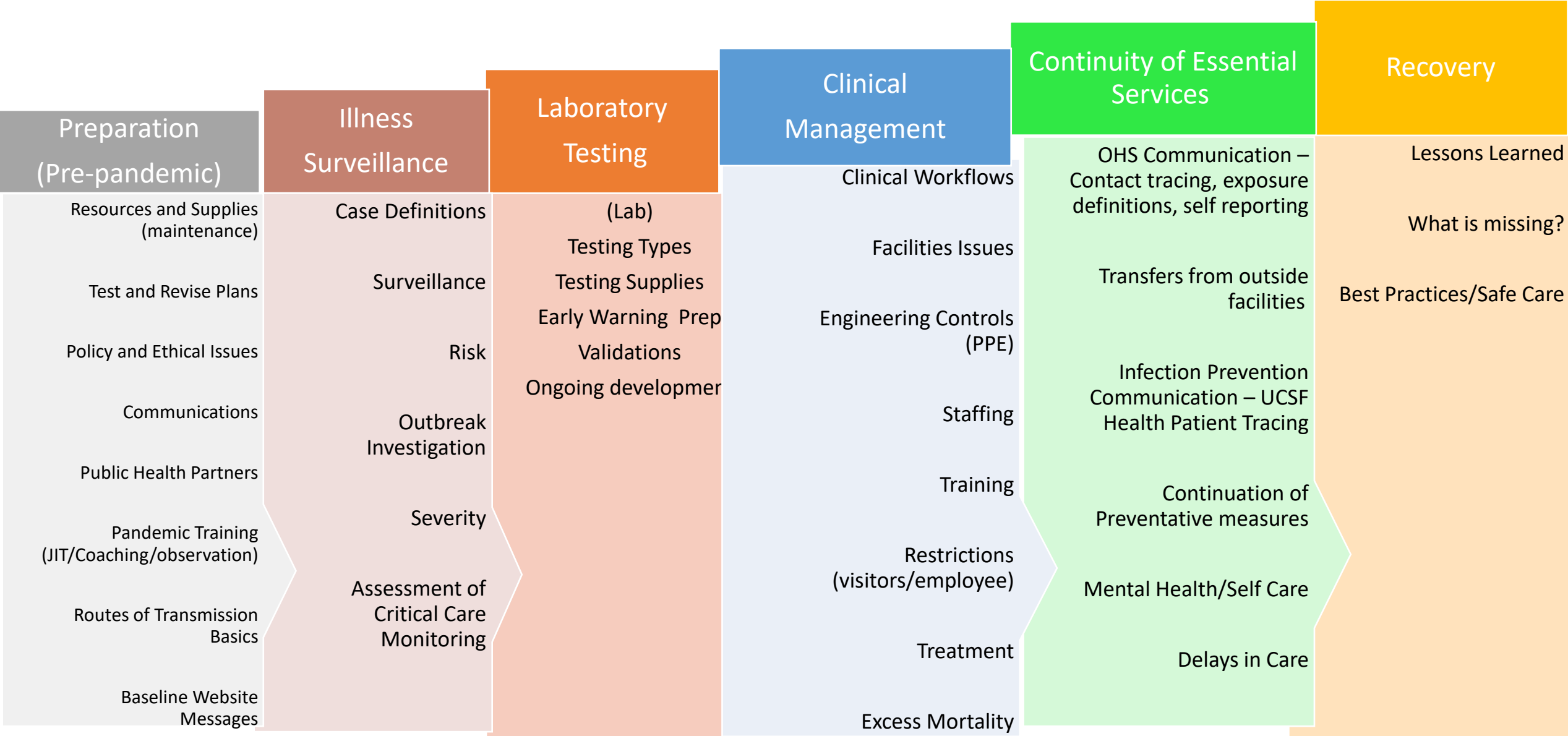
## Very high exposure risk:

- Healthcare employees (such as doctors, nurses, dentists, and other clinical staff) performing direct patient care and procedures on known or suspected source patients
- Healthcare or laboratory personnel collecting or handling specimens from known or suspected source patients (for example, manipulating cultures from known or suspected source patients).

## High exposure risk:

- Healthcare delivery and support staff exposed to known or suspected source patients (for example, doctors, nurses, and other hospital staff that must enter patient's care area) and their environment.
- Medical transport of known or suspected source patients in enclosed vehicles (for example, emergency medical technicians).
- Performing autopsies on known or suspected source patients (for example, morgue and mortuary employees).

# HEIP Pandemic Preparation for Perioperative Care





# Resources for Response Guidance

(May include others not listed here)



# To cause an infection, a pathogenic organism must:

Leave original host (patient or employee)

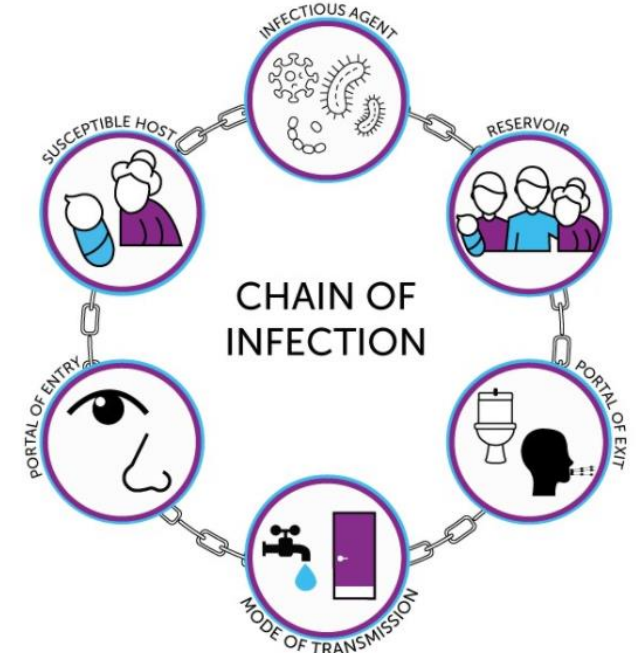
↳ Survive in transit (direct or indirect contact, droplets, aerosols, airborne)

↳ Be delivered... (via contaminated hands, equipment, surfaces, droplets, or air currents)

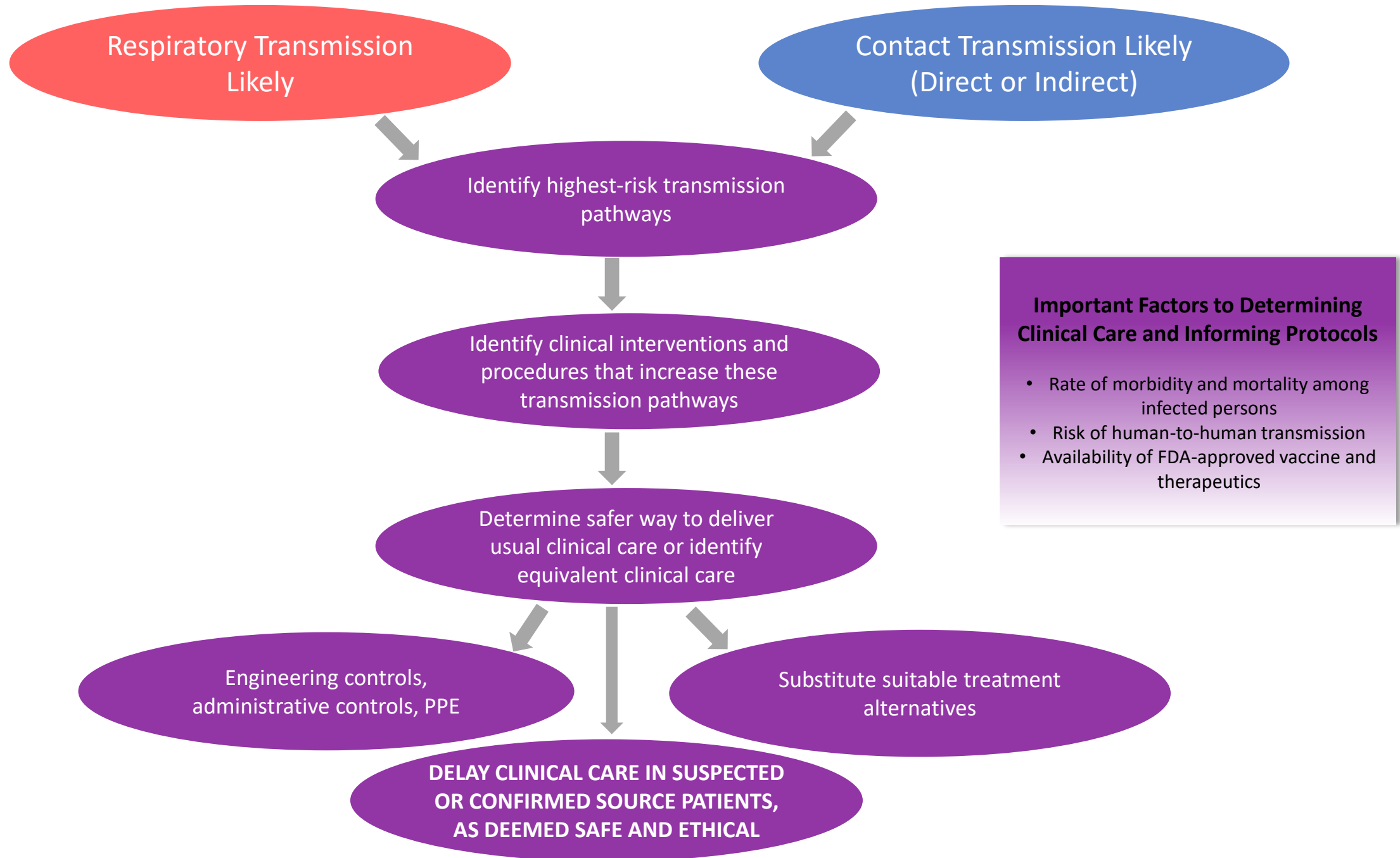
↳ ...to a susceptible part of a host (patient or employee: nonintact skin, mucous membrane, and/or other susceptible tissues)

↳ Escape host defenses (immune system, integumentary system)

↳ Multiply and cause tissue damage, etc. (infection)

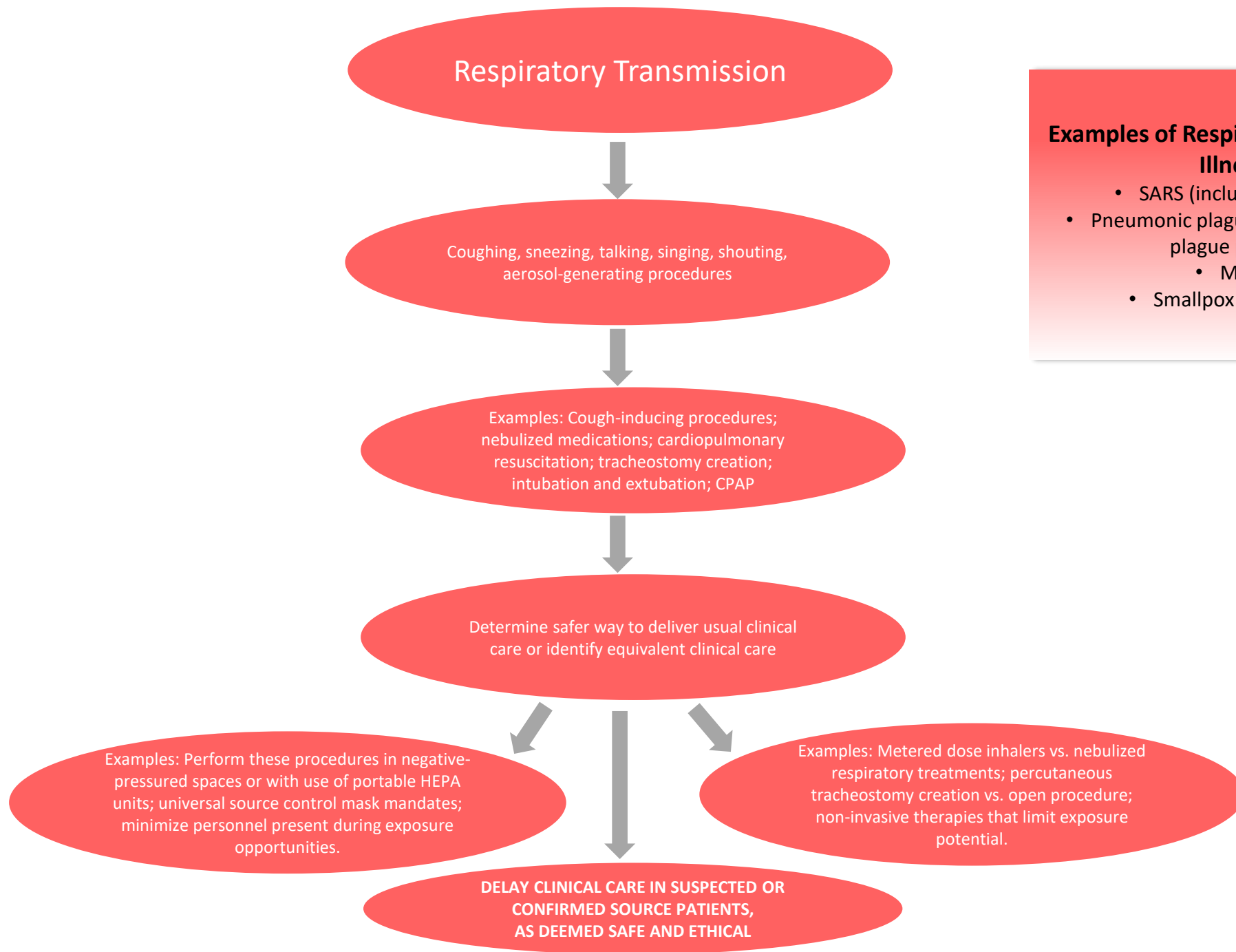


# How Might Clinical Care Change During a Pandemic?





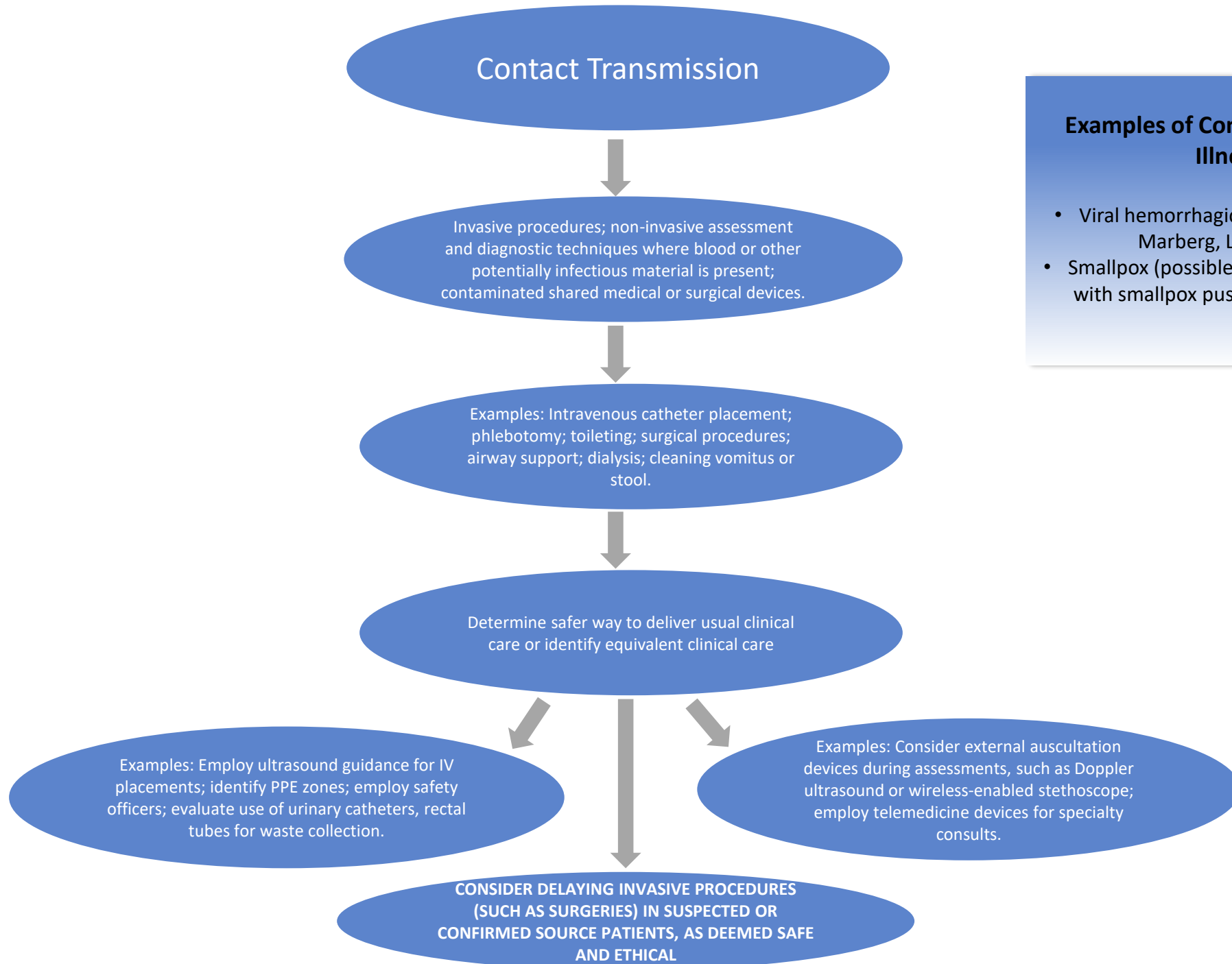
# Example of How Might Clinical Care Change During a Pandemic



## Examples of Respiratory-Transmitted Illnesses

- SARS (including COVID-19)
- Pneumonic plague (from person with plague pneumonia)
  - Measles
- Smallpox (also contact)

# Example of How Might Clinical Care Change During a Pandemic

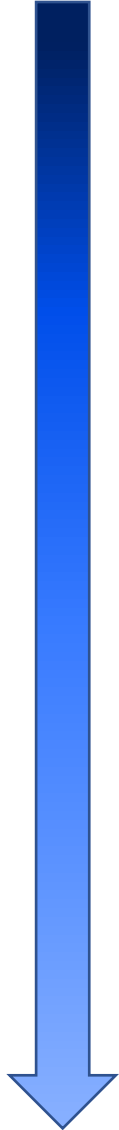


## Examples of Contact-Transmitted Illnesses

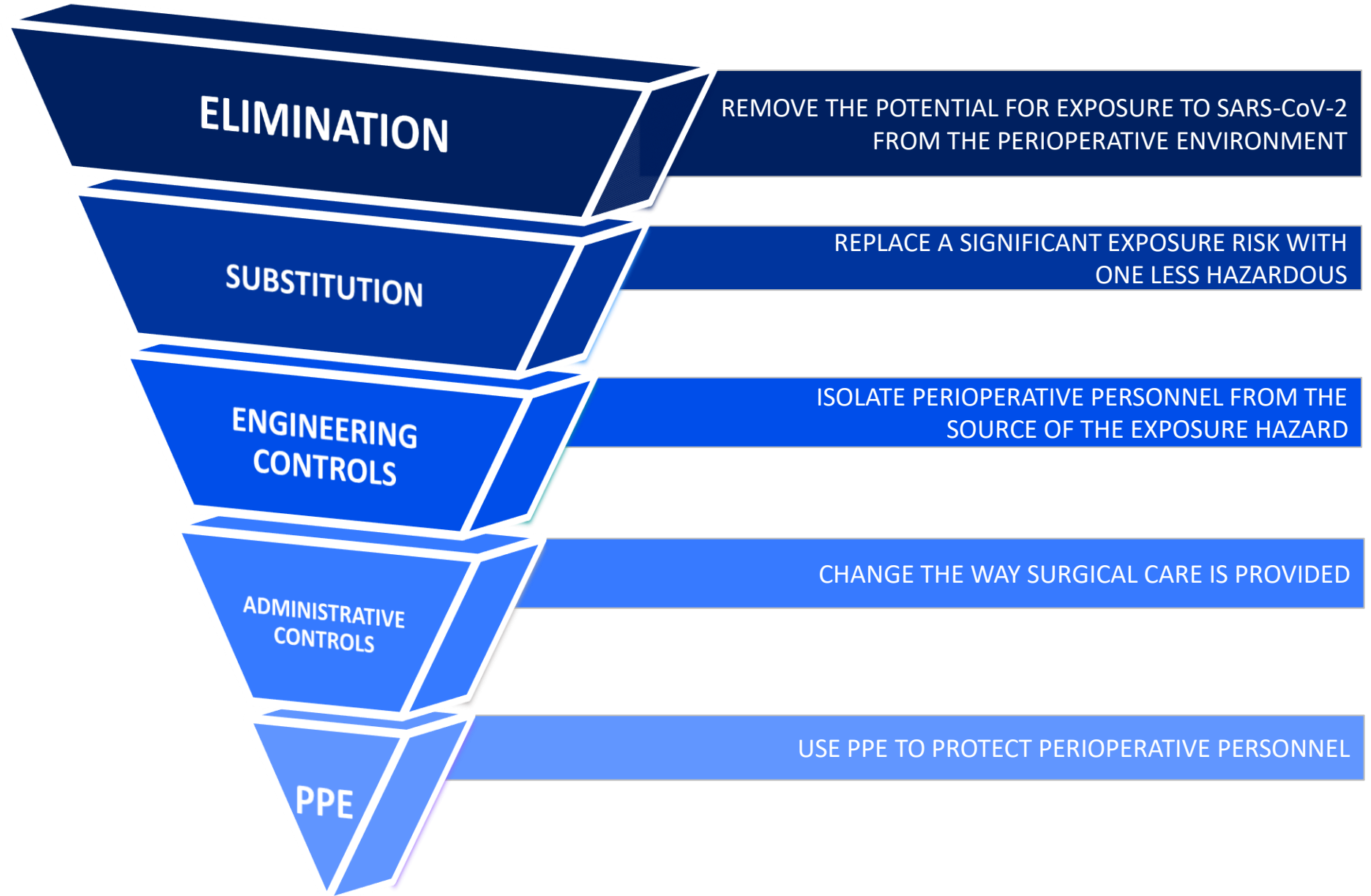
- Viral hemorrhagic fevers such as Ebola, Marburg, Lassa Fever, etc.
- Smallpox (possible when in direct contact with smallpox pustules or crusted scabs)

# Hierarchy of Controls

**MOST**  
EFFECTIVE, RELIABLE, AND  
SUSTAINABLE



**LEAST**  
EFFECTIVE, RELIABLE, AND  
SUSTAINABLE



## ELIMINATION

**REMOVE THE POTENTIAL FOR EXPOSURE TO SARS-CoV-2  
FROM THE PERIOPERATIVE ENVIRONMENT**

**As feasible (based on patient acuity), identify patients  
that are considered sources for the pathogen of concern.**

- Symptom-based screening before and on day of surgery
- Test-based protocol, as close to time of preoperative or surgical admission as possible
- Based on clinical judgment and/or USCF protocols for pathogen, postpone surgical procedures until patients are considered no longer infectious

**As feasible, identify healthcare workers  
that are considered sources for pathogen of concern.**

- Symptom-based screening prior to start of work shift
- As resources permit, offer testing to healthcare workers (symptomatic and asymptomatic)
- Healthcare workers that are identified to be a possible or confirmed source for pathogen of concern should not report for duty until excluded as a source and/or no longer infectious

## SUBSTITUTION

REPLACE A SIGNIFICANT EXPOSURE RISK WITH  
ONE LESS HAZARDOUS

Based on clinical judgment of the treatment team, patients identified as potential or confirmed sources for pathogens of concern may be able to have alternative treatments that reduce transmission risk to perioperative personnel while providing comparable clinical benefits.

- Minimally-invasive procedures instead of the use of open surgical techniques  
Example: Percutaneous procedure for tracheostomy creation instead of open procedure
- Non-surgical treatment options  
Example: Chemotherapeutic or radiotherapy-based tumor reduction in cancer care prior to or instead of surgical resection

## ENGINEERING CONTROLS

### ISOLATE PERIOPERATIVE PERSONNEL FROM THE SOURCE OF THE EXPOSURE HAZARD

Strategies that control existing exposures to personnel in the workplace; designed to remove the hazard at the source (NIOSH, 2015).

- Multidisciplinary assessment of existing HVAC systems that serve perioperative spaces where exposures can occur, including Perioperative Services, Facilities Management, HEIP, Safety, and others as deemed vital
- Calculation of air exchanges and determining air relationships in these perioperative spaces
- Time-based air turnover strategy to remove 99% of airborne contaminants, based on CDC guidance and/or most current evidence-based guidance and local air exchange calculations
- Multidisciplinary assessment of risks vs benefits of “reversing” air flow in operating rooms from positive to negative air relationships, including Perioperative Services, Facilities Management, HEIP, Safety, and others as deemed vital



## ENGINEERING CONTROLS

### ISOLATE PERIOPERATIVE PERSONNEL FROM THE SOURCE OF THE EXPOSURE HAZARD

Strategies that control existing exposures to personnel in the workplace; designed to remove the hazard at the source (NIOSH, 2015).

- Modify existing space or construct new (temporary) anteroom that is pressurized in the opposite air relationship to the operating room(s), i.e.: positive-pressured OR, negative-pressured anteroom
- Local exhaust ventilation systems, such as negatively-pressured intubation boxes, must be constructed and implemented safely to not create unintended risks
- Use of single-use HEPA filters or viral filters on Y-piece of breathing circuits
- For laparoscopic procedures, trocar ports remain closed when using insufflators without desufflation features. Create a closed ultrafiltration system for surgical smoke and pneumoperitoneum evacuation with trocars in place and ports closed before disconnecting tubing
- Effective cleaning and disinfection of surfaces to remove gross soils and fomites, as well as application of EPA-registered disinfectant validated for the pathogen(s)/pathogen class of concern
- Postanesthesia care provided in an airborne infection isolation room (AIIR), if available, or remain in the OR if AIIR is not available

## ADMINISTRATIVE CONTROLS

### CHANGE THE WAY SURGICAL CARE IS PROVIDED

To protect healthcare workers from possible or confirmed persons infected with pathogen(s) of concern, the way work is performed will likely require changes to prevent exposures and reduce transmission opportunities.

- Administrative controls include policies, procedures, and protocols that guide care and are intended to reduce or eliminate exposure to patient and/or healthcare worker sources
- These may originate from the University of California and/or UCSF Health, but will likely also require Perioperative Services-specific application and documentation to implement
- Administrative controls can be easy to establish, but costly to implement and difficult to sustain
- Advanced planning, multidisciplinary collaboration, and clear communication are vital to establishing sustainable administrative controls

## ADMINISTRATIVE CONTROLS

### CHANGE THE WAY SURGICAL CARE IS PROVIDED

To protect healthcare workers from possible or confirmed persons infected with pathogen(s) of concern, the way work is performed will likely require changes to prevent exposures and reduce transmission opportunities.

Administrative controls to consider include:

- Consider shifting case schedules (including block times) in order to stagger shift start times and reduce the number of personnel present in the department at one time
- Identify which operating room(s) can be designated and prepared to care for patients that are possible/confirmed/unknown status for the pathogen(s) of concern
- For specialty operating room(s) that must be used for specific surgeries (ie: hybrid operating room), identify and record the necessary behaviors to safely provide clinical care in these spaces while minimizing exposure potential
- Determine if patients will be able to undergo pre-operative preparation in Preop, if admission to an inpatient nursing unit is necessary to facilitate direct transfer to the operating room(s)
- Design and implement pre-procedure/pre-operative huddle with entire team to review planned case, supplies needed, designate roles, and ask questions
- Restrict visitors and non-essential personnel from operating room, especially during activities that increase transmission risk

## ADMINISTRATIVE CONTROLS

### CHANGE THE WAY SURGICAL CARE IS PROVIDED

To protect healthcare workers from possible or confirmed persons infected with pathogen(s) of concern, the way work is performed will likely require changes to prevent exposures and reduce transmission opportunities.

Administrative controls to consider include:

- Implement and maintain strict use of sign-in/sign-out logs to monitor and track personnel exposure and illness tracing
- Identify and maintain minimal supplies that will allow for safe provision of care in designated operating room(s). Consider using dedicated mobile supply carts and restrict access into supply cabinets and carts inside specialty operating room(s) where patients that are possible/confirmed/unknown status are cared for
- Stage a “runner” for supplies that are outside of the operating room(s) that can obtain necessary supplies during surgery to minimize traffic inside the operating room, minimize door openings between the operating room and corridor or substerile space, and minimize PPE usage
- Identify and record path(s) of travel to/from the operating rooms. Employ runner to clear expected path of travel to minimize traffic present in hallway
- Debrief with procedural/perioperative team after the procedure

PPE

## USE PPE TO PROTECT PERIOPERATIVE PERSONNEL

Necessary PPE is first informed by the following:

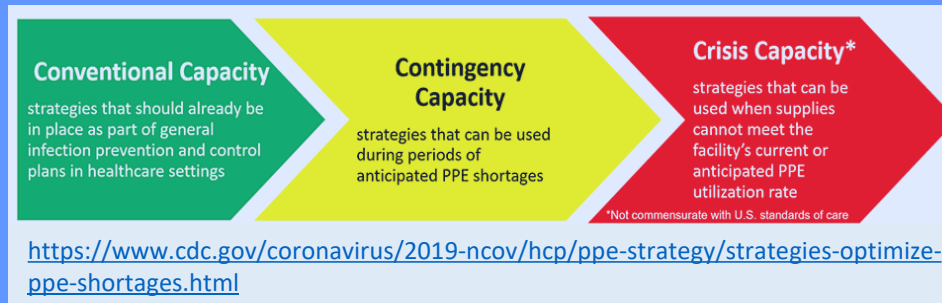
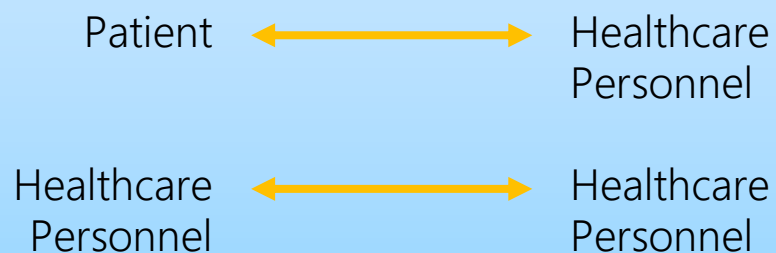
- 1) Task(s) being performed
- 2) Route(s) of transmission
- 3) Risk(s) for exposure

PPE recommendations will come from multidisciplinary team for UCSF Health

When inventories are fragile, PPE use may be informed at institutional level by capacity strategies

Implementation of capacity strategies may require changes to usual donning/doffing processes

### Effective PPE Use Protects:



## ELIMINATION

REMOVE THE POTENTIAL FOR EXPOSURE TO SARS-CoV-2  
FROM THE PERIOPERATIVE ENVIRONMENT

**As feasible (based on patient acuity), identify patients that are considered sources for the pathogen of concern.**

- Symptom-based screening before and on day of surgery
- Test-based protocol, as close to time of preoperative or surgical admission as possible
- Based on clinical judgment and/or USCF protocols for pathogen (informed by latest published guidelines and evidence), postpone/abstain from surgical procedures until patients are considered no longer infectious

**As feasible, identify healthcare workers that are considered sources for pathogen of concern.**

- Symptom-based screening prior to start of work shift
- As resources permit, offer testing to healthcare workers (symptomatic and asymptomatic)
- Healthcare workers that are identified to be a possible or confirmed source for pathogen of concern should not report for duty until excluded as a source and/or no longer infectious



## SUBSTITUTION

REPLACE A SIGNIFICANT EXPOSURE RISK WITH  
ONE LESS HAZARDOUS

Based on clinical judgment of the treatment team, patients identified as potential or confirmed sources for pathogens of concern may be able to have alternative treatments that reduce transmission risk to perioperative personnel while providing comparable clinical benefits.

- Minimally-invasive procedures instead of the use of open surgical techniques
  - Example: Interventional radiology procedures to provide clinical treatment; endoscopic surgery instead of open surgical techniques
- Non-surgical treatment options
  - Example: Chemotherapeutic or radiotherapy-based tumor reduction in cancer care prior to or instead of surgical excision

## ENGINEERING CONTROLS

ISOLATE PERIOPERATIVE PERSONNEL FROM THE  
SOURCE OF THE EXPOSURE HAZARD

Strategies that control existing exposures to personnel in the workplace;  
designed to remove the hazard at the source (NIOSH, 2015).

- Safety devices in use for sharps, such as disposable scalpels with retractable safety shield and self-sheathing needles
- Neutral zone passage of sharp devices and instruments among surgical team
- Continued use of needleless systems for IVs
- Closed collection devices for collecting potentially infectious patient-derived materials (such as rectal tubes, urinary catheters, etc.)
- Deflation of abdomen or chest of all insufflation pressure prior to removing trocars to avoid spraying of potentially infectious material from cavity
- Determine where and with which EPA-registered (if available) disinfectant(s) to clean non-disposable equipment

## ADMINISTRATIVE CONTROLS

### CHANGE THE WAY SURGICAL CARE IS PROVIDED

To protect healthcare workers from possible or confirmed persons infected with pathogen(s) of concern, the way work is performed will likely require changes to prevent exposures and reduce transmission opportunities.

- Administrative controls include policies, procedures, and protocols that guide care and are intended to reduce or eliminate exposure to patient and/or healthcare worker sources
- These may originate from the University of California and/or UCSF Health, but will likely also require Perioperative Services-specific application and documentation to implement
- Administrative controls can be easy to establish, but costly to implement and difficult to sustain
- Advanced planning, multidisciplinary collaboration, and clear communication are vital to establishing sustainable administrative controls

## ADMINISTRATIVE CONTROLS

### CHANGE THE WAY SURGICAL CARE IS PROVIDED

To protect healthcare workers from possible or confirmed persons infected with pathogen(s) of concern, the way work is performed will likely require changes to prevent exposures and reduce transmission opportunities.

- Minimize personnel present to essential to provide and support safe care
- Implement strict use of sign-in/sign-out logs for personnel for exposure and illness tracing
- Identify PPE and safety zones (hot, cold) to delineate safe boundaries
- Employ safety officers that will inform and monitor safe donning and doffing of PPE, as well as self-contamination events
- Provide full uniform attire to healthcare workers to wear while providing or supporting direct patient care. Develop plan and procedure to provide attire and changing areas
- Assess need for decontamination showers post-provision or support of direct patient care. Develop plan and procedure to set-up and implement such showers

## ADMINISTRATIVE CONTROLS

### CHANGE THE WAY SURGICAL CARE IS PROVIDED

To protect healthcare workers from possible or confirmed persons infected with pathogen(s) of concern, the way work is performed will likely require changes to prevent exposures and reduce transmission opportunities.

- Identify waste management strategies for medical waste, linens
- Identify specimen management strategies, including pathology specimens
- Identify and fit designated procedural/OR space to perform care for patients that meet suspected or confirmed definitions for pathogen of concern
- Design and implement pre-procedure/pre-operative huddle with entire team to review planned case, supplies needed, designate roles, and ask questions
- Transport patients direct to designated procedural/OR space
- Identify path of travel for treatment team to arrive to and leave from procedural space; designate “clean” person to interact with the environment during transport within facilities

## ADMINISTRATIVE CONTROLS

### CHANGE THE WAY SURGICAL CARE IS PROVIDED

To protect healthcare workers from possible or confirmed persons infected with pathogen(s) of concern, the way work is performed will likely require changes to prevent exposures and reduce transmission opportunities.

- Judicious use of video intubation equipment, ultrasound guidance, and other visualization technologies to minimize time for performing invasive procedures, reduce potential for exposure-generating errors
- Avoidance of aerosol-generating procedures should be considered
- Employ “runner(s)” and two-way communication systems to communicate and obtain supplies not present inside clinical space
- As necessary, to limit personnel present and preserve PPE provide specialty consultation using telehealth and other remote communication tools
- Consider designating dedicated equipment to remain in designated procedural/OR space
- Debrief with entire perioperative/procedural team after the procedure



PPE

## USE PPE TO PROTECT PERIOPERATIVE PERSONNEL

Necessary PPE is first informed by the following:

- 1) Task(s) being performed
- 2) Route(s) of transmission
- 3) Risk(s) for exposure

PPE recommendations will come from multidisciplinary team for UCSF Health

Special PPE donning and doffing strategies may be implemented to minimize self-contamination opportunities

When inventories are fragile, PPE use may be informed at institutional level by capacity strategies

### Effective PPE Use Protects:

