

TIP No. 98-132-0421

## INSTRUCTIONS FOR THE ENVIRONMENTAL HEALTH RISK ASSESSMENT FOR EVENT GATHERINGS IN THE COVID-19 OPERATING ENVIRONMENT

### PURPOSE

To provide instructions on use of U.S. Army Public Health Center's (APHCs) coronavirus disease 2019 (COVID-19) Environmental Health Risk Assessment and Risk Mitigation for in-person events.

### BACKGROUND

Based on Centers for Disease Control and Prevention (CDC) guidance for event planning during the COVID-19 pandemic, APHC has maintained a guide for Environmental Health Risk Assessment and Risk Mitigation (<https://ephc.amedd.army.mil/HIPECatalog/viewItem.aspx?id=1863>) (Figure 1). Event planners should complete this assessment to evaluate the risk of their event, and apply the recommended mitigations wherever possible before, during, and after the event. Throughout this document, "risk assessment" is speaking specifically to risk associated with COVID-19.

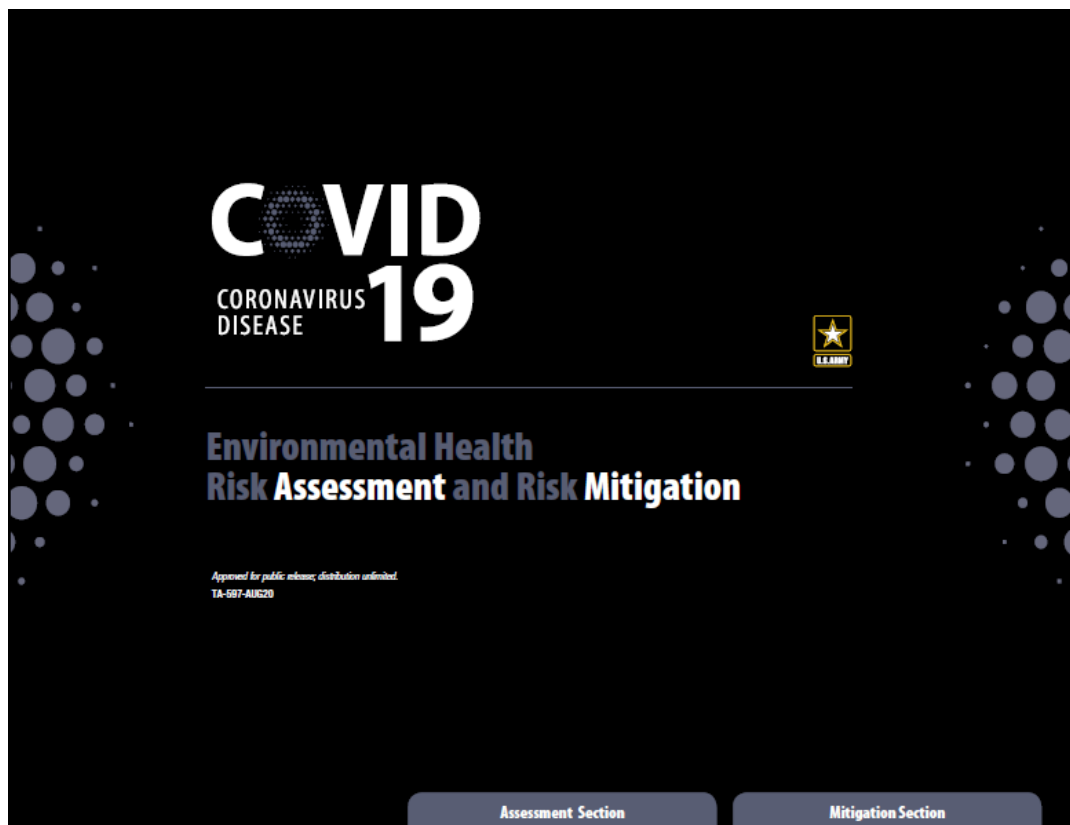


Figure 1. Environmental Health Risk Assessment and Risk Mitigation Tool

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In applying this tool to the standardized Army Risk Assessment Matrix (Figure 2), the risk level given in the Risk Assessment portion of the document reflects the probability level (i.e., the likelihood that an event will happen (in this context, the “event” refers to SARS-CoV-2 transmission and infection)). The severity or expected consequence of transmission/infection depends largely on individual attendee factors (e.g., age, body mass index, medical conditions).

### INPUTS

To conduct a thorough risk assessment, there is a variety of inputs to be considered. Inputs are used to determine the outputs of initial risk of specific activities at an event; the residual risk of the activities based on proposed countermeasures; and the overall risk for the event. Some of these inputs include, but are not limited to the—

- Size of the room(s) in which an indoor event is held
- Ventilation system of the facility for indoor events
- Number of attendees (not only participants, but also facility and catering staff)
- The activities that will be conducted during the event (e.g., meeting, live band, eating, physical activities)
- Countermeasures that will be in place (e.g., masks, distancing, limited duration, hybrid approach (virtual and in-person), vaccination status of attendees)
- Seating arrangement
- Current incidence rate and test positivity rate of COVID-19 in the jurisdiction surrounding the event

### OUTPUTS

Risk estimates are derived from the inputs to the assessment and are based on severity and probability. The concepts of Army risk assessment methodology are described in Army Techniques Publication (ATP) 5-19, “Risk Management” ([https://armypubs.army.mil/epubs/DR\\_pubs/DR\\_a/pdf/web/atp5\\_19.pdf](https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/atp5_19.pdf)). The following are the three types of risk that were determined during the health risk assessment for an event with regard to COVID-19:

- Initial Risk: The initial risk of an activity for the event if it occurs in the absence of any countermeasures.
- Residual Risk: The risk remaining for an activity, after controls have been implemented. Controls are altered until the residual risk is at an acceptable level or until it cannot practically be further reduced.
- Overall Risk: Overall risk after all controls are implemented.

Risk Assessment Matrix		Probability (expected frequency)				
		Frequent: Continuous, regular, or inevitable occurrences	Likely: Several or numerous occurrences	Occasional: Sporadic or intermittent occurrences	Seldom: Infrequent occurrences	Unlikely: Possible occurrences but improbable
Severity (expected consequence)		A	B	C	D	E
<b>Catastrophic:</b> Mission failure, unit readiness eliminated; death, unacceptable loss or damage	I	EH	EH	H	H	M
<b>Critical:</b> Significantly degraded unit readiness or mission capability; severe injury, illness, loss or damage	II	EH	H	H	M	L
<b>Moderate:</b> Somewhat degraded unit readiness or mission capability; minor injury, illness, loss, or damage	III	H	M	M	L	L
<b>Negligible:</b> Little or no impact to unit readiness or mission capability; minimal injury, loss, or damage	IV	M	L	L	L	L
<b>Legend:</b> EH - Extremely High Risk H - High Risk M - Medium Risk L - Low Risk						

**Figure 2. Risk Assessment Matrix**

### ADDITIONAL RISK ASSESSMENT TOOLS

There are two COVID-19-specific publicly available tools to aid in the risk assessment process. These tools have various inputs and provide specific outputs.

The Georgia Tech (GT) “COVID-19 Event Risk Assessment Planning Tool” requires the sole input of the number of attendees at the event (Figures 3 and 4). Using the incidence rate of the county where the event will occur, it outputs the estimated chance (0-100%) that at least one COVID-19 positive individual will be present at an event. This tool does not incorporate the incidence rate of the location from which each attendee is traveling. If individuals are traveling to an event from an area of high COVID-19 incidence, this tool may underestimate risk of infection at the event. The GT tool is available at <https://covid19risk.biosci.gatech.edu/>.

### COVID-19 Event Risk Assessment Planning Tool

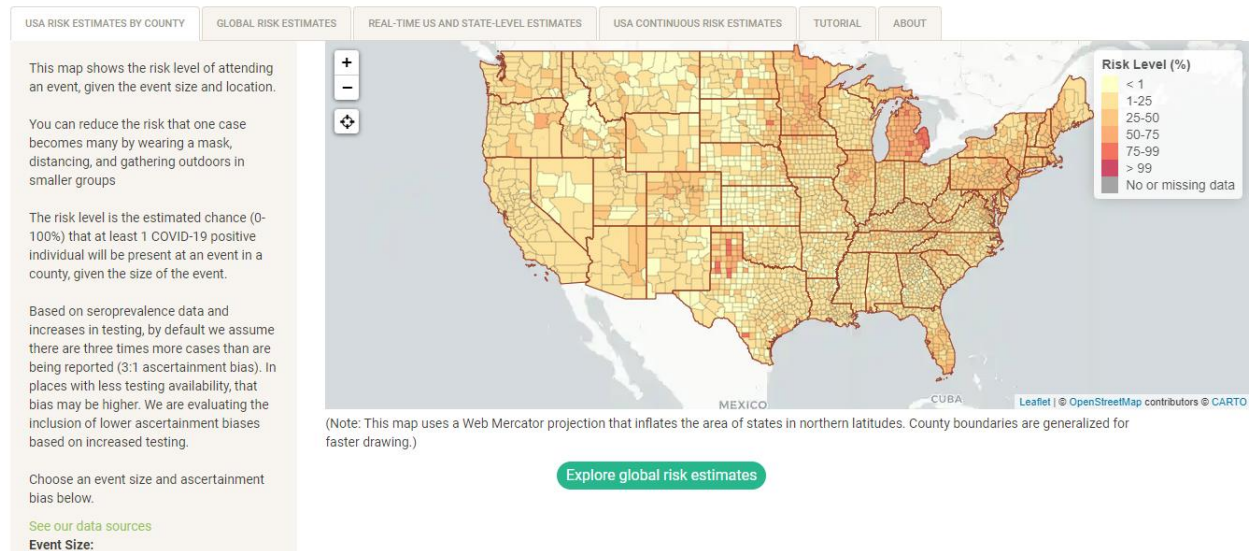


Figure 3. GT “COVID-19 Event Risk Assessment Planning Tool”

### COVID-19 Event Risk Assessment Planning Tool

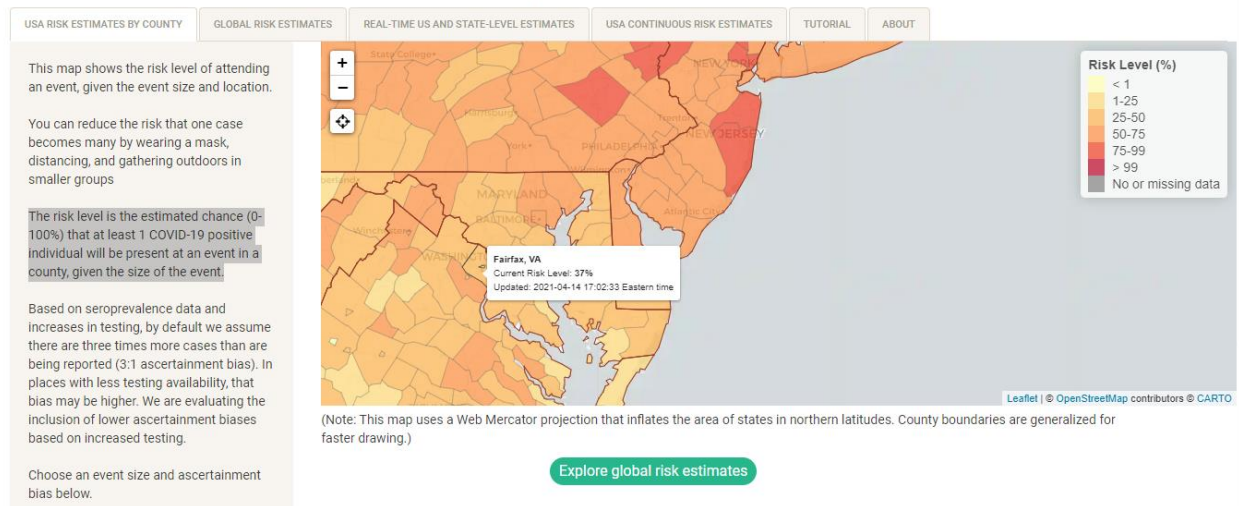


Figure 4. GT “COVID-19 Event Risk Assessment Planning Tool” Risk Level Example

In contrast, the MIT “COVID-19 Indoor Safety Guideline” tool uses multiple event characteristics as inputs (Figures 5–7). Using a theoretical model to calculate safe exposure times and occupancy levels for indoor spaces, the tool outputs the necessary mitigating measures. By adjusting room specifications; ventilation and filtration rates; facemask usage; level of respiratory activities; and risk tolerance (located in the other tabs), the user can see which mitigations should be applied to minimize risk of COVID-19 transmission in different indoor spaces. The MIT tool is available at <https://indoor-covid-safety.herokuapp.com/>

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**COVID-19 Indoor Safety Guideline**

The screenshot shows the 'About' tab of the MIT COVID-19 Indoor Safety Guideline tool. At the top right, there are dropdown menus for Language (English), Units (British), and Mode (Basic). Below these are navigation tabs: About, Room Specifications - Details, Human Behavior - Details, and Frequently Asked Questions. The 'About' tab contains introductory text and a summary of the tool's purpose. On the right side, there are three dropdown menus for Room Specifications (set to Custom), Human Behavior (set to Masks, Speaking), and Age Group (set to Adults (15-64 years)). Below these is a dropdown for Viral Strain (set to SARS-CoV-2 (Wuhan Strain)). A central text box states: 'To limit COVID-19 transmission\* after an infected person enters this space, there should be no more than: 2 people for >14 days, 5 people for 120 hours (5 days), 10 people for 54 hours (2 days), 25 people for 20 hours, 100 people for 5 hours.' Below this, it notes that the six-foot rule would limit occupancy to 25 people, which would violate the guideline after 20 hours. At the bottom, two summary boxes show: 'If this room has 10 people, the guideline\* would be violated after 54 hours (2 days).', and 'If people spend approximately 4 hours here, the occupancy should be limited\* to >100 people.'

**Figure 5. MIT “COVID-19 Indoor Safety Guideline” tool**

The screenshot shows the 'Room Specifications - Details' tab of the MIT COVID-19 Indoor Safety Guideline tool. The 'Room Specifications - Details' tab is active, showing input fields for: Total floor area (sq. ft.): 900; Average ceiling height (ft.): 12; Ventilation: 3.0 hr<sup>-1</sup> (outdoor ACH) with a dropdown for Mechanical Ventilation; Filtration System: MERV 6 with a dropdown for Residential/Commercial/Industrial; Recirculation Rate: 1.0 hr<sup>-1</sup> with a dropdown for Moderate; and Relative Humidity: 60% with a slider ranging from 1% (Very Dry) to 99% (Very Humid). On the right side, the Room Specifications, Human Behavior, and Age Group dropdowns are the same as in Figure 5. The Viral Strain dropdown is also the same. The central text box is identical to Figure 5. At the bottom, the summary boxes are also identical to Figure 5. A small 'DHAP' logo is visible in the bottom right corner.

**Figure 6. MIT “COVID-19 Indoor Safety Guideline” Tool Room Specifications Inputs**

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The screenshot displays the 'Human Behavior - Details' section of the MIT 'COVID-19 Indoor Safety Guideline' tool. It features a navigation menu with 'About', 'Room Specifications - Details', 'Human Behavior - Details', and 'Frequently Asked Questions'. The main content area is divided into several sections:

- Human Behavior - Details:** Includes input fields for Breathing Rate (0.29 ft<sup>3</sup>/min), Respiratory Activity (2.04 q/ft<sup>3</sup>), Mask Type/Efficiency (90%), and Mask Fit/Compliance (95%). A slider for Mask Fit/Compliance ranges from 0% (None) to 95% (Good).
- Room Specifications:** Includes dropdown menus for Room Specifications (Custom), Human Behavior (Masks: Speaking), and Age Group (Adults (15-64 years)).
- Viral Strain:** Includes a dropdown menu for SARS-CoV-2 (Wuhan Strain).
- Guidelines:** A text box stating: 'To limit COVID-19 transmission\* after an infected person enters this space, there should be no more than: 2 people for >14 days, 5 people for 120 hours (5 days), 10 people for 54 hours (2 days), 25 people for 20 hours, 100 people for 5 hours. In contrast, the six-foot (or two-meter) rule would limit occupancy to 25 people which would violate the guideline\* after 20 hours.'
- Footnote:** '\*The guideline restricts the probability of airborne transmissions per infected person to be less than the risk tolerance (10%) over the cumulative exposure time listed. Other risk scenarios are considered in Advanced Mode. Specifically, one may consider the prevalence of infection in the population, immunity acquired through vaccination or previous exposure, and the risk to a specific individual.'
- Summary:** Two text boxes at the bottom: 'If this room has 10 people, the guideline\* would be violated after 54 hours (2 days).' and 'If people spend approximately 4 hours here, the occupancy should be limited\* to >100 people.'

**Figure 7. MIT “COVID-19 Indoor Safety Guideline” Tool Human Behaviors Inputs**

A description of each control, including who and how it will be implemented, should be clearly explained in the risk assessment. If certain event factors cannot be changed and/or appropriate controls cannot be implemented, APHC’s recommendation will likely be to not conduct the event in an in-person format.

The DD Form 2297 “Deliberate Risk Assessment Worksheet” (available at <https://www.nec.belvoir.army.mil/dol/documents/DRAW.pdf>) should be used when completing your COVID-19 risk assessment for an event. This standard form walks the user through the various steps of the risk assessment.

### APHC SUPPORT

APHC has developed the APHC “General Health Risk Assessment Guidance,” which is available via request to the APHC COVID-19 Task Force ([usarmy.apg.medcom-aphc.mbx.covid-19-task-force@mail.mil](mailto:usarmy.apg.medcom-aphc.mbx.covid-19-task-force@mail.mil)). This can assist in the COVID-19 health risk assessment process, particularly when determining countermeasures and high-risk activities.

APHC is available to review completed risk assessments—preferably in the DD Form 2297—with event planners and offer additional guidance. However, event planners should first seek assistance for the risk assessments from their Regional Health Command (RHC). Current COVID incidence rates and HPCONs remain elevated at a point where most gatherings of individuals present significant risk of transmission and infection. APHC has limited capacity to

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conduct risk assessments on behalf of event planners, but is able to provide consultative support during the planning process.

Please provide a completed “Environmental Health Risk Assessment and Risk Mitigation” form to the APHC Task Force ([usarmy.apg.medcom-aphc.mbx.covid-19-task-force@mail.mil](mailto:usarmy.apg.medcom-aphc.mbx.covid-19-task-force@mail.mil)) when requesting assistance to interpret the risk of your planned event: <https://ephc.amedd.army.mil/HIPECatalog/viewItem.aspx?id=1863>.