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Communicable Disease Preparedness: Modelling and Simulation Framework for Analyzing Cabin Health Hazards

Contributors to this project

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Project details

Research domain: Computer and information sciences

Project Start: 12 Jan 2023

Project End: 31 Jul 2025

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Ethical issues related to data that this DMP describes? unknown

Citation

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When connecting to this DMP to related project outputs (such as datasets) use the ID:
https://doi.org/10.48321/D10D9E1D06

Funding status and sources for this project

Status: Planned
Funder: United States Department of Transportation
Funding opportunity number:

Project description

The most recent pandemic exposed critical gaps in the aviation system's ability to assess and manage communicable disease risks within the Safety Management System (SMS) framework. In response, a multi-year research effort developed the prototype, open-source Travel Risk In Pandemics (TRIP-X) simulation model to extend FAA Order 8040.4 Safety Risk Management principles to respiratory and biological hazards in air travel. TRIP-X integrates ventilation, human behavior, operational, and microbiological factors using airport and aircraft data to quantify transmission risk, evaluate layered controls, and support evidence-based decision-making. Beyond pandemic preparedness, TRIP-X enables tailored protective strategies for repatriation and humanitarian operations—such as safely evacuating personnel during Ebola or other severe outbreaks without imposing unnecessary restrictions—while also optimizing outbreak and epidemic management to balance public-health protection with the continuity of air travel, commerce, and societal mobility. Additionally, it supports homeland security and threat preparedness by providing a framework for structured threat and vulnerability analyses of intentional biological releases, strengthening aviation safety, public-health coordination, and national defense readiness under a unified risk-management approach.

Planned outputs

Communicable Disease Transmission in Air Travel: Human Behaviour - Phase 1 Report

Comprehensive data acquisition plan and methodology based on the risk estimation model architecture proposed by FAA and industry collaborators.

https://doi.org/10.21949/1528567

Format: Data paper
Anticipated volume: unspecified
Release timeline: 24 Sep 2023
Intended repository: ROSA P

Communicable Disease Transmission in Air Travel: Human Behaviour - Phase 2 Dataset

Dataset of human behaviours captured both in the field and laboratory airport gates, jet-bridges and narrow-body aircraft cabin settings.

https://doi.org/10.21949/9mcd-qm43

Format: Dataset
Metadata Standard(s): DCAT-US
Anticipated volume: unspecified
Release timeline: 28 Aug 2025
Intended repository: ROSA P
License for reuse: CC-BY-NC-SA-4.0

Communicable Disease Transmission in Air Travel: Human Behaviour Phase 2 Report

Describes human behaviour data collected based on methodologies defined under Phase 1.

https://doi.org/10.21949/2nev-k207

Format: Data paper
Anticipated volume: unspecified
Release timeline: 28 Aug 2025
Intended repository: ROSA P

Communicable Disease Transmission in Air Travel: PCA Ventilation Phase 2 Report

Describes PCA ventilation data collected in the Phase 2 PCA Ventilation dataset.

https://doi.org/10.21949/ra9s-4d52

Format: Data paper
Anticipated volume: unspecified
Release timeline: 28 Aug 2025
Intended repository: ROSA P

Communicable Disease Transmission in Air Travel: PCA Ventilation Phase 2 Dataset

Dataset and data dictionary of PCA ventilation data captured in the field at airport jet-bridges with aircraft present.

https://doi.org/10.21949/8hk0-ph61

Format: Dataset
Metadata Standard(s): DCAT-US
Anticipated volume: unspecified
Release timeline: 28 Aug 2025
Intended repository: ROSA P
License for reuse: CC-BY-NC-SA-4.0

Communicable Disease Transmission in Air Travel: Phase 2 Jet-bridge Ventilation Dataset

This dataset includes jet-bridge ventilation data collected in both (?verify?) field and laboratory settings. It also includes airport building pressure data.

https://doi.org/10.21949/qqdx-gh59

Format: Dataset

Metadata Standard(s): DCAT-US
Anticipated volume: unspecified
Release timeline: 28 Aug 2025
Intended repository: ROSA P
License for reuse: CC-BY-NC-SA-4.0

Communicable Disease Transmission in Air Travel: Phase 2 Jet-bridge Ventilation Report

This report describes the methods for collecting the jet-bridge ventilation dataset.

https://doi.org/10.21949/ac4p-zd78

Format: Data paper
Metadata Standard(s): DCAT-US
Anticipated volume: unspecified
Release timeline: 28 Aug 2025
Intended repository: ROSA P
License for reuse: CC-BY-NC-SA-4.0
