



## COVID-19 RESEARCH DEMONSTRATION PROGRAM: EFFICACY OF UV LIGHTS IN TRANSIT APPLICATIONS

### Background

The SARS-CoV-2 (COVID-19) pandemic has revealed vulnerabilities in our systems to safeguard public health. Although the transmission of SARS-CoV-2 via surfaces (fomites) is low risk, it can occur. In fact, there is evidence that SARS-CoV-2 virus particles remain viable on non-porous surfaces such as metal for days to weeks. This is especially concerning in the context of public transit. It is possible that non-porous surfaces such as handles and handrails that are frequently touched by passengers harbor active SARS-CoV-2. In addition, the general cleanliness of these surfaces (i.e., presence of bacteria and other viruses) is also a concern. Two of the most common approaches to disinfect such surfaces are (1) fogging the public vehicles with germicidal chemicals and (2) irradiation with ultraviolet (UV) light. Currently, Rock Region Metropolitan Transit Authority utilizes chemical spraying to disinfect vehicles. However, UV irradiation has major advantages over chemical treatments.

### Objectives

The primary objective of this study was to compare the effectiveness of chemical disinfection and UV light irradiation to reduce SARS-CoV-2 on frequently touched surfaces in public transit vans. The secondary objective was to compare the effectiveness of these methods to reduce bacteria (*Escherichia coli* and total coliform) on the same surfaces.

### Findings and Conclusions

*The results of this project provide preliminary evidence suggesting UV light is effective to disinfect frequently touched surfaces in public transit vehicles that should be confirmed with additional studies.*

Very few samples in the study had detectable SARS-CoV-2 or *E. coli* so the results for those microbes were inconclusive. Furthermore, when all samples were included, the results for total coliforms were equivocal. However, for paired handrail samples with coliform-positive pre-treatment specimens, there was a significant decrease in total coliform counts after UV irradiation. In addition, the mean UV radiation dose recorded from the vans far exceeded the doses reported to reduce active *E. coli* and SARS-CoV-2 by  $\geq 90\%$  in earlier studies. Taken together and interpreted within the context of the prior literature, UV light may be as effective as, or more effective than, chemical fogging.

## **Benefits**

If confirmed in additional studies, the data indicate that use of UV light could improve the ease and efficiency of vehicle disinfection for public transit agencies that currently use chemical methods. In addition, the results from this study can shed light on optimal sampling and analytical methods for future efforts to address the research question posed in this project.

## **FTA Report No. 0259 Project Information**

This research project was conducted by Justin Avery, Jon Wisniewski, Wendy Hunter, and Blake Mhoon of the Rock Region Metropolitan Transit Authority, as well as a third-party contractor to perform the testing and reporting of test results, Environmental Services Company, Inc. For more information, contact FTA Project Manager Tara Clark at (202) 366-2623, [tara.clark@dot.gov](mailto:tara.clark@dot.gov).

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