The role of Shared Resources in facilitating human and environmental surveillance for SARS-CoV-2

George Grills[1], Siôn Williams[1,3], Benjamin Currall[1], Natasha Schaefer Solle[1], Melinda Boone[1], Mark Sharkey[3], Braden Tierney[7], Jonathan Foox[7], Thomas Stone[1], Marissa Brooks[1], Corneliu Sologon[1], Elena Cortizas[1], Kristina Babler[4], Jiangnan Lyu[2], Zarnegarnia Yalda[2], Xue Yin[4], Krista Ryon[7], Bhavarth Shukla[6], Naresh Kumar[1], Dušica Vidović[1,5], Stephan Schürer[1,5], Christopher Mason[7], Helena Solo-Gabriele[4]

[1]Sylvester Comprehensive Cancer Center, University of Miami Miller School of Medicine, Miami, FL, USA
[2]Clinical & Translational Science Institute, University of Miami Miller School of Medicine, Miami, FL, USA
[3]Center for AIDS Research, University of Miami Miller School of Medicine, Miami, FL, USA
[4]Environmental Engineering Laboratory, College of Engineering, University of Miami, Miami, FL, USA
[5]Institute for Data Science and Computing, University of Miami, Miami, FL, USA
[6]Department of Medicine, Division of Infectious Diseases, University of Miami Miller School of Medicine, Miami, FL, USA
[7]Institute for Computational Biomedicine, Weill Cornell Medicine, New York, NY, USA

The Sylvester Comprehensive Cancer Center Shared Resources, working closely with other shared resources at the University of Miami (UM), helped establish and provide coordinated support for a multi-institutional study on environmental monitoring of SARS-CoV-2, the virus that causes COVID-19 disease, including surface, air, and wastewater-based sampling. This project provides a case study of how a diverse array of shared resources can work together to facilitate human and environmental surveillance for SARS-CoV-2. The study is a collaborative effort between researchers at UM and Weill Cornell Medicine. The shared resources involved in this project include a group of Sylvester Shared Resources, including the Behavioral and Community Based Research Shared Resource (BCSR), Biospecimen Shared Resource (BSSR), and Onco-Genomics Shared Resource (OGSR), along with the Miami Clinical and Translational Science Institute (CTSI) Biostatistics Collaboration and Consulting Core (BCCC), and the Miami Center for AIDS Research (CFAR) Laboratory Sciences Core. UM deployed an extensive human surveillance testing, tracking and tracing system to monitor students, faculty, and staff. This study extended these efforts to encompass wastewater surveillance of SARS-CoV-2 from buildings on all the UM campuses, the city of Miami and surrounding county, public schools in the county, and UM-affiliated hospitals. The goals of this study are to generate, optimize, standardize, and compare SARS-CoV-2 human and wastewater surveillance with various sampling, processing, detection, and analysis techniques. The environmental viral surveillance data is integrated with community and hospital COVID-19 disease prevalence, with the aim of developing predictive models of local and regional level spread of the disease. The results from this effort are informing public health strategies on local and community levels and may serve as a model more broadly for other existing and emerging pathogens. We present here lessons learned, current results, and future directions, with a focus on the role and impact of the shared resources.