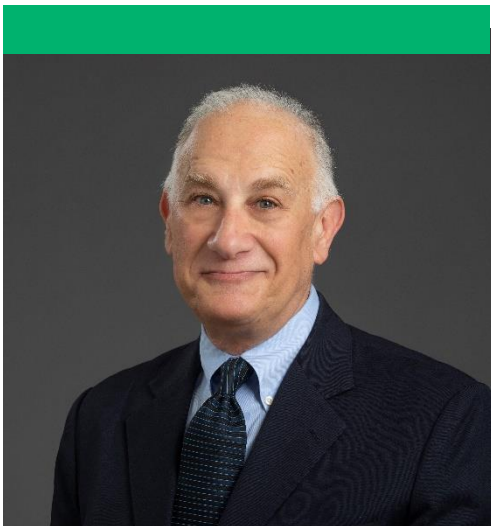
RUSH

Robert A. Weinstein, MD

The C. Anderson Hedberg, MD, Professor of Internal Medicine



Advancement of Medicine

In 2024, I continued to study Long COVID. I have been the national principal investigator, or PI, for a Centers for Disease Control and Prevention-funded contract at Rush focusing on COVID-19's natural history of infection by comparing "Long COVID" symptoms over two to three years in those with and without SARS-CoV-2 infection. In addition to Rush as the lead site, we have collaborated with medical researchers at Yale New Haven Health; the University of Washington; University of California, Los Angeles; University of California, San Francisco; Thomas Jefferson University; University of Texas Health Houston; and University of Texas Southwestern Medical Center to enroll approximately 6,000 participants nationally.

In 2024, this project was extended into a bridge year to continue to follow our national cohort of COVID-19 survivors, with a goal of understanding the impact of the pandemic on patients' and the nation's well-being and, importantly, tracking additional long-term health care costs of the pandemic. During this bridge year, I have transitioned leadership for the extended data analyses to my co-PI to provide upward mobility for younger faculty.

What have we found? Major results so far include a protective effect of vaccination for COVID-19, lessening risk of subsequent Long COVID, importantly to a greater extent based on the number of vaccine booster doses received; similarity of post-COVID long-term symptoms in those with COVID compared with other infections (or due to the disruptive effects of the pandemic on life per se); occurrence of chronic fatigue syndrome in 3-5% of COVID patients and also in those with other infections during the pandemic; a number of equity issues for those with Long COVID; shifts over time in the type and prevalence of Long COVID symptoms, with continued general improvement over three to 12 months; and a suggestion, in preliminary analyses, that risk of Long COVID may be linked to presence of obesity in patients with SARS-CoV-2 infection, which raises the question of use of newer weight-loss medications for pandemic preparedness.

Based on our data, we have 16 publications in peer-reviewed medical journals and another eight manuscripts in preparation or under journal review, which is a publication record that far exceeds the usual productivity of federally funded studies. Our data have been used by the CDC as a dashboard to provide information on the CDC's website for the research community and the public about the rates of Long COVID.

Before COVID, my research focused on control of antibiotic-resistant bacteria and fungi. We have shown the role of intensive care units as epicenters of resistance in hospitals and the role of long-term care facilities in the regional spread of resistant organisms. Importantly, our work has demonstrated novel and effective control measures to stem this spread. Specifically, we have shown that ill patients in hospitals, especially those in intensive care and in long-term care facilities, are like microbiologic chameleons, in that the skin of these patients often becomes covered with the host institution's most resistant bacteria and with bacteria more often found in the lower GI tract.

This finding of changes in the skin "microbiome" led to a key and unique infection control intervention — daily patient cleansing with disinfectant wipes — to remove this "patina of resistant bacteria." This approach, which we developed and pioneered at Rush and Cook County Hospital, is now used in most hospital intensive care units and many long-term care facilities in the United States and in many hospitals worldwide. This intervention continues to be studied actively, and multi-institution studies by others repeatedly have supported the effectiveness and impressive value of this approach.

Research

Funds from the C. Anderson Hedberg, MD, Endowment have ensured my continued ability to conduct the seminal infection control research described above and contribute to new research endeavors aimed at understanding the ongoing COVID pandemic and developing potential cures for Long COVID.

Clinical Trials

In addition to leading our CDC-funded project, "Innovative Support for Patients with SARS-CoV-2 Infections (INSPIRE) Registry," I have been a co-investigator on several studies funded by the CDC, National Institutes of Health, and Agency for Healthcare Research and Quality.

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Publication Highlights — Abbreviated

- I continue to co-author op-eds for *Chicago Tribune* and other news outlets about COVID and other infectious diseases.
- A compilation of my 37 co-authored and other op-eds on COVID, "The COVID Diaries 2020-2024: Anatomy of a Contagion As It Happened," was published in 2024. Co-authored by Cory Franklin, MD. A review of this book can be found at https://letstalkscience.eu/2024/04/23/covid-19-an-outbreak-of-books/
- I continue to contribute chapters to the landmark textbook *Harrison's Textbook of Medicine* and to Bennett and Brachman's *Hospital Infections Textbook*.
- I continue to serve on the International Scientific Advisory Board for the European Clinical Research Alliance on Infectious Diseases, or ECRAID, and continue to serve as a subject matter expert reviewer for *UpToDate*.
- I served on Illinois and Chicago Health Department Advisory Committees; was an expert reviewer for multiple medical journals; served on the Editorial Board for *Infection Control and Healthcare Epidemiology*; served as an advisor on antibiotic resistance for the editors of the CDC-based journal *Emerging Infectious Diseases*; and have been an expert consultant for Boston University's CARB-X program, which funds startup pharmaceutical companies that are developing potential solutions to antibiotic resistance problems.
- In addition to my Long COVID publications and op-ed pieces, I have been a co-author on additional peer-reviewed publications in 2024:
    - "Genomic Epidemiology of Severe Acute Respiratory Syndrome Coronavirus 2 in a County Jail," *Open Forum Infectious Diseases* (2024).
    - "Reducing Hospitalizations and Multidrug-Resistant Organisms via Regional Decolonization in Hospitals and Nursing Homes," *JAMA* (2024).
    - "Stewardship Prompts to Improve Antibiotic Selection for Pneumonia – The INSPIRE Randomized Clinical Trial," *JAMA* (2024).
    - "Stewardship Prompts to Improve Antibiotic Selection for Urinary Tract Infection – The INSPIRE Randomized Clinical Trial," *JAMA* (2024).
    - "A Trial of Automated Outbreak Detection to Reduce Hospital Pathogen Spread," *NEJM Evidence* (2024).

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The Year Ahead: 2025 and Beyond

We are in the process of extending the study of our patients with Long COVID into a randomized, placebo-controlled intervention trial. We will be assessing the ability to improve symptoms of Long COVID by modulating patients' gut-immune system axis by using an orally administered probiotic. This approach is based on a current understanding of potential mechanisms underlying the progression of COVID into Long COVID.

With my colleagues, we will continue to refine our tracking and control of antibiotic-resistant bacteria and fungi on a regional, statewide and national scale. This work will include a particular focus on intensive care units, long-term care facilities, and refinements of a statewide hospital tracking system — the XDRO Registry — that we developed several years ago. The registry is now used by the Illinois Department of Public Health as an essential part of its antibiotic resistance control activities.

With Gratitude

It is an honor and privilege to be the C. Anderson Hedberg, MD, Professor of Internal Medicine and to have my role at Rush and my work supported by your generosity. Dr. Hedberg was a leader in American medicine. To occupy a professorship in his name continues to be a great distinction, and I trust that my accomplishments are worthy of this honor. I treasure this position and the opportunities it has unlocked at Rush as well as at the regional, national and international levels.