

UTAH HERO PROJECT



Tracking Covid-19 to
Inform the Return to Normal



Report Published **March 31, 2021**

Included in this Report

- Summary of HERO Project testing & analysis in southern Salt Lake County and northern Utah County, both identified as hotspots of viral activity.

TABLE OF CONTENTS

Introduction	1
Key Findings (Findings as of March 23, 2021)	2
Community-Based Hotspot Testing	3
Background	3
Testing Results	3
Natural Immunity	3
Detection Fraction	4
Implications and Next Steps	5
Acknowledgments	6

Introduction

The Utah Health and Economic Recovery Outreach (HERO) Project began in May 2020 as a collaborative statewide testing and analysis project designed to help decision-makers understand the community-based activity of the SARS-CoV-2 virus and Covid-19 infection rates. The goal of the HERO Project is to collect and utilize high-quality local data to help inform decision-makers seeking to guide Utah's citizens and economy through a safe return to normalcy.

In the first three months of the project (May-July 2020), the HERO Project team of statisticians, researchers, and doctors oversaw the construction of a sampling method uniquely equipped to estimate the prevalence of Covid-19 in the general population through representative sampling. Key findings from this phase included a low overall rate of infection in Utahns and a relatively high rate of detection by health authorities in the state, meaning that not only a small number of Utahns had been infected, but that—compared to other states—few cases were going undetected.

Immediately following Phase 1 of the project, Phases 2 and 3 focus on adding to the information available to decision-makers through several new efforts:

- Continued testing throughout the state, coupled with longitudinal analyses, to provide insight into changing infection rates and detection by health authorities.
- Student- and teacher-testing in Utah K-12 schools, to advise officials as they seek to return students to classrooms safely and effectively.
- Surveying and analysis on the impacts of Covid-19 on Utah businesses and consumers, to support the state's economic recovery.
- Collecting information on vaccine uptake, impact, and implications, to inform the state's distribution efforts and ongoing management of the pandemic.

This report focuses on the HERO Project **community-testing in hotspots identified in Salt Lake and Utah Counties**, which has provided important insight into the conditions in some of the most highly infectious regions of the state and has significant impacts for ongoing decision-making.

Key Findings

Findings as of March 23, 2021

Rates of Antibody Presence are Expectedly Higher in Hotspots than Elsewhere

When testing the hotspots of concern to this report, the HERO Project found antibody prevalence rates of approximately 15% overall, which is 5 percentage points higher than the rates found in Salt Lake County more broadly around the same time period.

However, These Rates are Still Low in Relation to the Herd Immunity Threshold

As herd immunity is predicted at 75-90% of the population immune from either natural infection or vaccination. This means that a strong vaccination program will continue to be necessary to build upon the percentage of the population with natural immunity and control viral spread.

Utah's Testing Procedures Detected a High Percentage of Active Cases

Between July 2020 and March 2021, the HERO Project estimates Covid-19 testing in Utah has captured approximately 60% of active cases, which holds true in this round of hotspot testing. This indicates a relatively more successful testing program overall, though substantial disparities appear when looking at success rates by age.

Community-Based Hotspot Testing

Background

The central operation of the HERO Project involves testing for Covid-19 antibodies—an indicator of infection in the past and, presumably, immunity in the present and future. Importantly, antibody testing differs from active infection testing in that it seeks to detect whether an individual has been infected at *any* point, rather than specifically at the current moment. This testing first began in May 2020 with testing in Davis, Salt Lake, Utah, and Summit Counties, and has operated nearly continuously since.

At various times, the HERO team has performed testing in specific locations identified as hotspots of viral activity, including West Salt Lake in late summer and mid fall 2020, Provo in early fall 2020, and, centrally to this report, parts of southern Salt Lake County and northern Utah County in early 2021. In response, the HERO Project conducted a simple random sample of households in several cities across this region, testing households that had not previously been engaged with the project's community testing work.

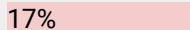


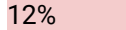
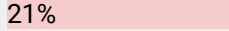

In our sampled geography, we attempted to contact 21480 households by mail, of which 10601 were in the Salt Lake County portion of our region and 10879 were in the Utah County portion. In Salt Lake County, we tested 909 individuals across 290 households, yielding a 2.7% household response rate. In Utah County, there were 1000 individuals across 291 households, also yielding a 2.7% response rate.

Testing Results

Natural Immunity

During hotspot testing in Salt Lake and Utah counties, the HERO Project determined that nearly 15% of the tested population was positive for Covid-19 antibodies. This is approximately 5 percentage points or 50% higher than the rates found in Salt Lake County broadly across a similar time period. Further, these data show other trends that diverge from those found in the county more widely, including less substantial disparities based on location, sex, ethnicity, and more. Importantly, these data are focused on unvaccinated individuals to increase the level of understanding around natural immunity in isolation.

	# of Respondents Tested	# (%) Positive; unadjusted*	% Positive; adjusted**
Population Subgroup			
Geographic Area: southern Salt Lake County	701	103 (15%)	15%
Geographic Area: northern Utah County	723	133 (18%)	19%
Sex: Female	677	110 (16%)	16%
Sex: Male	743	125 (17%)	17%
Ethnicity: Hispanic	94	13 (14%)	15%

Ethnicity: Non-Hispanic	1326	223 (17%)	17% 
Age: younger than 18	570	92 (16%)	16% 
Age: 18-25	80	18 (23%)	24% 
Age: 26-45	435	53 (12%)	12% 
Age: 46-65	303	62 (21%)	21% 
Age: 66 or older	36	11 (31%)	33% 
OVERALL		15%	15%

* these results come from HERO Project testing with the EuroImmun test

** uses HERO Project estimates of antibody test accuracy

Detection Fraction

The HERO Project team sought to estimate the effectiveness of state testing procedures at capturing cases within the community. This is a concern due to the prevalence of asymptomatic cases, for which individuals may not get tested, creating the opportunity for Covid-19 to spread undetected. The HERO Project uses a measure called detection fraction, which essentially measures the percentage of positive Covid-19 cases that have been caught by state testing procedures. The HERO team estimates the detection fraction through two methods: examining what proportion of the project's seropositive individuals report receipt of a prior positive test as well as comparing UDOH case counts to seroprevalence. This discussion includes takeaways from utilizing both methods.

During the early months of the pandemic, HERO estimated a detection rate of approximately 40%, meaning that for each case detected, 1.5 cases went undetected. Over time and across geography, this rate has increased substantially, averaging to approximately 60% detection. This means that for every 3 detected cases, there are around 2 undetected cases.

This fraction largely holds true for the testing of central concern to this report: HERO findings indicate approximately 55% detection in southern Salt Lake County, compared to 64% in the Salt Lake City School District area. This computes to an overall detection fraction estimated at **60%**, in alignment with that found by the HERO team in Salt Lake County more broadly around the same time frame and that since May 2020 across the state.

Importantly, this detection fraction shows substantial differences between different age groups. Across both hotspot locations, the detection fraction among those younger than 18 is estimated near 39%, compared to about 74% for those 18 and older. Again, this trend is aligned with that found in other testing around the same time and trends present across the state. While the cause of this discrepancy is not fully understood, it is widely understood that children experience symptoms at lower rates, which may be a factor. Regardless, this trend's presence implies an important opportunity for improvement in testing those younger than 18.

Implications and Next Steps

As infection, vaccination, and a number of variants continue to spread throughout the state of Utah, it will be important to maintain an understanding of immunity to inform the state's ongoing policymaking. While immunity has been somewhat increasing due to natural spread of the virus, and somewhat more so in hotspot areas like those central to this report, HERO Project analysis indicates that the state remains far from herd immunity. This suggests that an ongoing successful vaccination program is required to achieve a high level of protection from Covid-19. In the meantime, good public health practices including maintaining social distancing, hand washing, and wearing face masks remain essential to controlling the pandemic.

To continue informing state leadership and Utah residents going forward, the HERO Project will continue to conduct testing in the community for several more weeks, before shifting to focus on priorities like understanding the impacts of vaccine distribution. The HERO team will continue to publish results on a regular basis, seeking to inform the public and decision-makers about moving towards normalcy with safety in mind.

Acknowledgments

The Utah HERO Project has benefited from the support and guidance of many individuals and organizations dedicated to ensuring the wellbeing of Utahns during the Covid-19 Pandemic. Leading the HERO Project are Stephen C. Alder, PhD; Adam Looney, PhD; and Matt Samore, MD. The project is funded by the State of Utah in coordination with the Governor's Office of Management and Budget and the Utah Department of Health.

Senior advisors to the project are Taylor Randall, MBA, PhD; Natalie Gochmour, MS; and Michael Good, MD. The Project team includes Andrew T. Pavia, MD; Julio Delgado, MD, MS; Adam Hersh, MD; Krow Ampofo, MD; and Tom Greene, PhD. The following teams and centers supported the execution of the project.

Center for Clinical & Translational Science Study Design and Biostatistics Center

Brian Orleans, MS
Gentry Carter
Angela Presson, PhD
Chong Zhang, MS
Jian Ying, PhD
Chelsea Allen, PhD
Andrew Redd, PhD
Molly Mcfadden, MS
Ben Brintz, PhD
Tyler Bardsley, MS
Yue Zhang, PhD
Jincheng Shen, PhD

Division of Epidemiology

Kristina Stratford, PMP, CCRP
Tavis Huber
Molly Leecaster, PhD
Candace Haroldsen, BS
Xiangyang Ye, PhD

Marriner S. Eccles Institute for Economics and Quantitative Analysis

Nathan Seegert, PhD
Mac Gaulin, PhD
MJ Yang, PhD

University of Utah Health Clinical Operations

Michael Bronson, JD, MBA
Nikki Gilmore, MSN, RN
Christina Butterfield, MSN, RN
David Ence, MHSA

Survey Design and Measurement Core

Morgan Millar, PhD

Utah HERO Project Team

Alicen Bringard, MPA
Elizabeth Rabon, MA
Jill Stephenson, MPA
Soumava Basu, PhD
Jeanette Nelson, PhD
Christopher "Kit" Fry
Jonathan Frehner
Jamon Winegar
Devin Ostler
Annie Smith
Hannah Crane

The Church of Jesus Christ of Latter-Day Saints generously contributed the use of their parking lots and buildings to support mobile testing for this project. In addition, we thank the HERO Project's field team that has staffed and supported countless testing events across the state. We also appreciate the support of the National Center for Advancing Translational Sciences of the National Institutes of Health under Award Number UL1TR002538.

This report was developed by the Sorenson Impact Center at the University of Utah's David Eccles School of Business in partnership with the HERO Project leadership. Sorenson Impact works with public, nonprofit, and private sector stakeholders to develop, structure, and mobilize capital for innovative and data-driven approaches to difficult social and public health challenges. This report was created by Austin Hendrickson and Allison Nicholson.

For more information about this report, contact [Elizabeth Rabon](#), Associate Director of Administration for the Health & Development Initiative at the University of Utah.