

# 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 Salt Lake County

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# 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 Salt Lake County**, which has provided important insight into the changing conditions of the state's most urban locale and has significant implications for state decision-makers moving forward.

# Key Findings

## Findings as of March 25, 2021

### Active and Previous Infection in Salt Lake County Remain Relatively Low

Overall, active infection found by HERO Project testing in Salt Lake County computed to approximately 1%, with cumulative infection at around 10%. This is a relatively low prevalence of infection and antibodies, meaning that only a small percentage of Utahns have become naturally immune.

### Active and Previous Infection Show Disparities by Location and Demographics

Within Salt Lake County, certain demographic groups tested positive at higher rates than others: Hispanic residents at higher rates than non-Hispanic, and 18-25 year-olds at higher rates than any other age group.

### Cumulative Infection—and Associated Immunity—are Increasing Over Time

Since the beginning of the pandemic, rates of cumulative infection have been expectedly increasing, implying that the fraction of the population immune to Covid-19 is increasing as well. As vaccines continue to be distributed, this immunity will continue to expand at a faster rate.

### Utah's Testing Procedures Detect a High Percentage of Active Cases

Over the last 10 months, the HERO Project estimates Covid-19 testing in Utah has captured approximately 60% of active cases, which holds true in the most recent round of Salt Lake County testing. This indicates a relatively more successful testing program overall, though substantial disparities appear when looking at success rates by age.

### Utah is Getting Nearer Herd Immunity but Remains Distant Thus Far

To achieve herd immunity and some sense of normalcy, Utah should aim for between 75-90% of the population immune to Covid-19. Currently, the state still has far to go to reach this threshold, meaning that continued precautionary practices and a strong vaccination program are still essential in controlling the spread.

# Community-Based 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.

The HERO team has since performed three more rounds of testing in which Salt Lake County was included, collecting samples from thousands of residents between May 2020 and this report's publishing in March 2021. In the most recent round, the HERO Project set out to assess community spread of Covid-19 in Salt Lake County, chosen in part for the geography's ability to inform understanding of the rate of spread in Utah's most urban areas, which also consists of a diverse population.

In this round of testing, the HERO team attempted to contact 35267 households by mail, of which 19231 were in the geographic area encompassed by Granite School District and 16036 were in that of Salt Lake City School District. In Granite's boundaries, the team tested 1560 individuals across 685 households, yielding a 3.6% household response rate. In Salt Lake City School District's domain, we tested 1877 individuals across 946 households, also yielding a 5.9% household response rate.


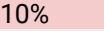

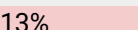



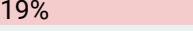


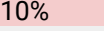
## Testing Results

### Active Infection

During these five weeks of testing across January and February in the geographic areas of Granite and Salt Lake City School Districts, the HERO Project determined that approximately 1% of the nearly 3,000 individuals tested were infected with Covid-19 at the time. This result differed across demographic categories in a number of ways, with the largest being Hispanic respondents testing positive at higher rates than non-Hispanic and 18-25 year-olds at higher rates than any other age group.

## Natural Immunity

These disparities in active infection are similarly present when looking at antibody test positivity. Again, this type of testing focuses on detecting whether an individual has Covid-19 antibodies that would indicate an infection at some point in the past, but not necessarily at present. Specifically, these data are focused on unvaccinated individuals to increase the level of understanding around natural immunity in isolation.

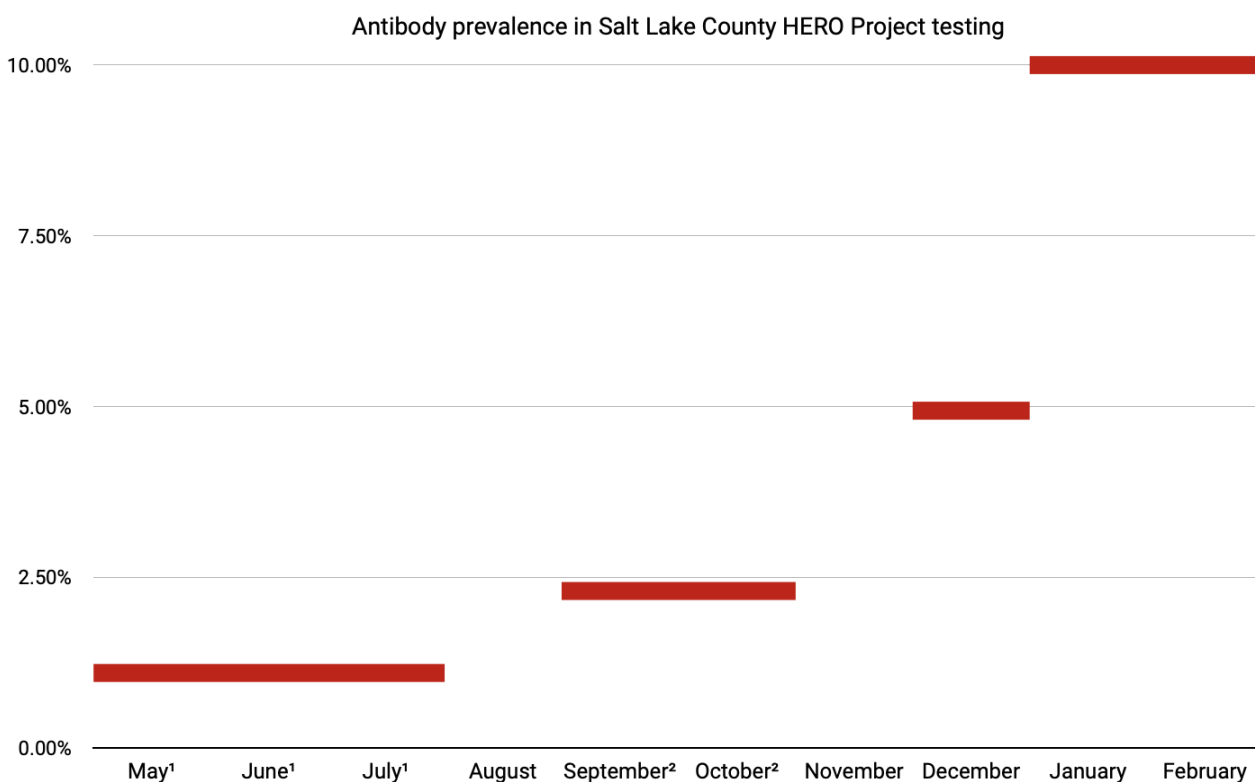
	# of Respondents Tested	# (%) Positive; unadjusted*	% Positive; adjusted**
<b>Population Subgroup</b>			
<b>Geographic Area:</b> Granite School District	897	113 (13%)	12% 
<b>Geographic Area:</b> Salt Lake City School District	1109	117 (11%)	10% 
<b>Sex:</b> Female	990	96 (10%)	9% 
<b>Sex:</b> Male	1005	134 (13%)	13% 
<b>Ethnicity:</b> Hispanic	227	52 (23%)	24% 
<b>Ethnicity:</b> Non-Hispanic	1772	178 (10%)	9% 
<b>Age:</b> younger than 18	477	54 (11%)	11% 
<b>Age:</b> 18-25	176	33 (19%)	19% 
<b>Age:</b> 26-45	661	79 (12%)	11% 
<b>Age:</b> 46-65	452	39 (9%)	8% 
<b>Age:</b> 66 or older	240	25 (10%)	10% 
<b>OVERALL</b>		<b>10%</b>	<b>9%</b>

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

\* uses HERO Project estimates of antibody test accuracy

## Tracking Results Over Time

Throughout the 10 months in which the HERO Project has been testing in Utah communities, the overall prevalence of Covid-19 antibodies has been gradually increasing, as shown below. In the first wave of testing in Salt Lake County (May through July 2020), participants had antibody prevalence estimated at 1.10%. The second round of testing (September & October 2020) saw an increased prevalence of 2.30% while the third (December 2020) was higher still, at 4.94%. As shown previously, this round of testing revealed a prevalence of 10%. This increase is expected, given the spread of the virus throughout the state. While the exact probability of reinfection is yet unknown, it is widely understood that increasing antibody presence among a community is associated with growth in natural immunity to the virus, which will be critical to consider as Utah continues to move towards herd immunity.



<sup>1</sup> Round 1 of testing in May-July 2020 also includes data from Davis, Summit, and Utah Counties

<sup>2</sup> Round 2 of testing in Sept-Oct 2020 also includes data from Davis and Utah Counties

## 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 January-February testing of central concern to this report: HERO findings indicate approximately 58% detection in the Granite School District geographic area, similar to 59% in the Salt Lake City School District area. This computes to an overall detection fraction estimated at **58.5%**.

Importantly, this detection fraction shows substantial differences between different age groups. In Salt Lake County, the detection fraction among those younger than 18 is estimated near 42%, compared to about 64% for those 18 and older. 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.

## Total Immunity

In addition to natural immunity that occurs through active infection of Covid-19, vaccine distribution is rapidly increasing the total immunity to the virus. However, given the still-low proportion of the population that has either been infected or fully vaccinated, Utah remains far from the herd immunity goal of 75-90% immune. As the state continues to ramp up vaccination in the coming weeks and months, the proportion of the population immune to the virus should continue to rapidly increase, eventually to a point conducive to somewhat of a return to "normal."



## 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, as evidenced by this most recent round of testing in Salt Lake County, a much more significant uptick in protection has—and continues to—come from the distribution of Covid-19 vaccines. Still, HERO Project analysis indicates that the state remains far from herd immunity, suggesting that an ongoingly 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.

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