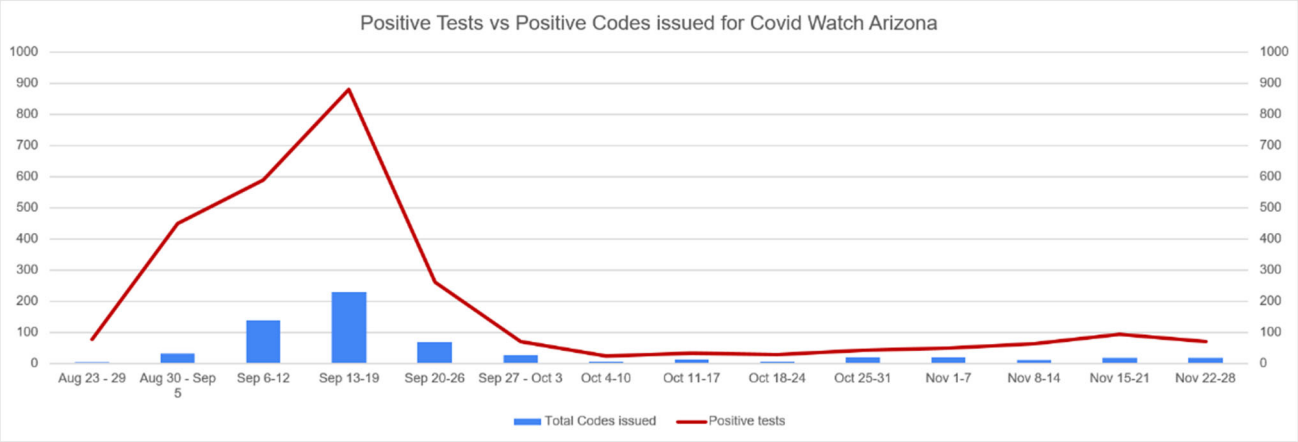
Summary of the University of Arizona success with the Covid Watch app

By the University of Arizona rollout team

The University of Arizona piloted the Covid Watch exposure notification app, which is completely anonymous and private by design. Covid Watch Arizona lets Android and Apple phone users anonymously notify other phone users they were in contact with about a positive Covid-19 diagnosis.

We were able to estimate the impact of the app indirectly, by asking questions about app usage during manual contact tracing, and by counting the number of times verification codes were issued to allow sharing a positive diagnosis via the app. This data covers the period from August 23 to November 28 among University of Arizona affiliated individuals. During this time, there was a significant outbreak of SARS-CoV-2 in the student population and use of the verification codes peaked in the same week as the confirmed cases in the outbreak.



47%

47% of infected individuals interviewed by manual contact tracers reported that they had previously downloaded the app. This demonstrates the app is being used by a significant number within the campus population. Interviews were conducted by a university team contracted to contact at times just on-campus student cases, at times all students, and at times all campus personnel tested in a campus program. Note that this number is different from more commonly cited metrics of the proportion of a population that has downloaded an exposure notification app as it is limited to a sub-set of the total population eligible to download. First, not all downloads recorded on the app store convert into active app users. Second, people who tend to comply with public health guidelines and participate in contact tracing might be both more likely to download an exposure notification app and less likely to contract SARS-CoV-2. Even so, downloads in infected individuals is still a very relevant number for impact on disease transmission.

26%

26% of infected individuals interviewed by manual contact tracers reported having previously entered a verification code into their app to anonymously notify their contacts. This represents more than half of infected, interviewed individuals who reported having downloaded the app (54%). As noted above, the people that contact tracers succeed in interviewing may have higher use

than the general campus population. However, we get the same estimate of 26% by dividing the total number of verification codes issued by the total number of positive tests in our campus community. We count verification codes (613 in total) at point of issue rather than upon usage, but because obtaining a code requires some action from an infected individual (either a phone call or clicking on a request link), we expect this to be only a slight overestimate. There are also factors that might cause this number to be an underestimate; specifically, we count positive tests not cases, and some individuals have tested positive more than once in our system. We feel confident that one quarter of cases have notified their contacts using the COVID Watch app because these two independent approaches both yield the same estimate of 26% infected individuals using Covid Watch to anonymously notify contacts of their diagnosis.

As these individuals reported to the contact tracers during the investigation that they had already sent the positive codes through the Covid Watch app, we can state that our system notifies contacts who use the Covid Watch app more rapidly than does the traditional contact tracing system at the University of Arizona. It is also more rapid than digital contact tracing where traditional contact tracers provide codes over the phone. We have developed an automated workflow for rapid code delivery via test results that is relatively simple for other test providers to adopt.

Our results can also be used to roughly estimate the impact of exposure notification. It is reasonable to assume that most viral transmission occurred within the campus community during this semester, given very different campus outbreak dynamics compared to the county at large. If the app worked perfectly, 26% cases enter a code into the app, and 47% of the contacts that they infect have the app, and if app-using cases have similar contact patterns to non-app-using cases, then an exposure notification would be received for 12% of the infections occurring in the campus community. If these notifications eliminated/reduced forward disease transmission by changing the behavior of possible secondary cases, this could reduce R(t) by 12%, and would be a significant contribution to transmission control. The actual reduction in R(t) may vary because of many factors. It may be higher if behavior changed because of increased non-significant exposure notifications (see below). It may be lower because individuals might not have their phone with them, app-using cases differ in their contact patterns than non-app-using cases, and because to stem disease transmission, the exposure notification must also be received quickly. Rapid notification is likely in our campus context, where 69% of codes were issued in conjunction with rapid antigen testing via our Test All Test Smart program. Importantly, the degree to which transmission is reduced will always depend on the degree to which notified contacts self-quarantine as directed, seek testing, or at least modify their behaviors to reduce onward transmission during the recommended quarantine period.

We do not report here on questions we asked about the receipt of exposure notifications. This is because early in the pilot app users may have received notifications from their phone operating system (not the app) for exposures that were non-significant. The same issue was encountered by national apps in the U.K. and Denmark. This happened because we used our own risk scoring system (https://www.medrxiv.org/content/10.1101/2020.07.17.20156539v2) rather than the risk system built-in by Google and Apple. Our data on exposure notifications includes many non-significant exposures as a result of this issue. After we resolved this issue, we were surprised to receive feedback from users who appreciated receiving information about these non-significant exposures and wanted access to this information restored. Future versions of the app will therefore incorporate higher and lower risk notifications by design. We will soon migrate to version 2 of the Google/Apple exposure notification

system, where operating system notifications are no longer sent, and their built-in risk scoring system has been revised to be much closer to the one we designed.

In summary: We have seen relatively high use rates for the Covid Watch exposure notification app in our campus community, as well as relatively high rates of positive diagnosis verification code requests. This is a useful tool to complement traditional contact tracing, and offers advantages in terms of speed, privacy, automation, and interoperability across different states and nations during a pandemic.