



Untap Ltd provides a COVID-19 Early Warning System to Reduce Workplace Absence

Untap gives insight into the previously unseen. It provides same-day data on the overall number of COVID-19 cases; should they be with symptoms, without symptoms or before any symptoms present. This is unmanageable using lateral flow or PCR testing due to time constraints, costs, and the innate trust required for all individuals to provide accurate, timely data.

In this case study, COVID-19 prevalence was forecast in two locations: site 1 is a design office with 40-person occupancy, site 2 is an engineering site with 120-person occupancy. Before Untap was installed, these sites both experiences COVID-19 related absences and suspected transmission in the workplace, due to a cascading number of COVID-19 absences. When COVID-19 was detected, the workplace was given the recommendation to carry out lateral flow testing. This early warning system identified individuals with COVID-19 before workplace transmission occurred, and therefore reduced absence.

INTRODUCTION

The COVID-19 pandemic has severely impacted public health and the global economy. Mass testing has been increasingly implemented in developed countries, frequently leading to equipment shortages, high costs and invasive testing procedures [1]. COVID-19 surveillance has been predominantly focused on testing symptomatic persons, this does not consider a-symptomatic or pre-symptomatic individuals, which make up approximately 40-56% of SARS-CoV-2 infections [2]. COVID-19 can be detected in wastewater before nasopharyngeal swab tests (i.e., lateral flow and PCR testing) both due to the ease of testing, and the nature of sampling. Monitoring the development of the COVID-19 pandemic in wastewater is cost-effective and time-efficient, as opposed to the nasal-pharyngeal swab tests currently in place [3]. Wastewater can predict a local outbreak up to a week before traditional testing methods.

METHOD

Wastewater was collected from two UK workplaces, site 1 and site 2. Site 1 is a UK design office with a 40-person occupancy. The collection method from this site was manual-sampling. This technique captures a snapshot in time of the community. Site 2 is a UK company head office with 120-person occupancy. The collection method was using a Hach AS-950 Autosampler. The Hach AS-950 Autosampler aggregates wastewater over a predesignated time period, to accurately reflect the whole community. The autosampler was programmed to collect 10ml wastewater samples per minute from the main outflow of the building.



Samples were collected using manual-sampling and using Hach Autosampler, shown here

Samples collected using the Autosampler span 12 hours each day, two 6-hour samples. These were separated into morning samples (AM) from 7am until 1pm, and afternoon samples (PM) from 1pm until 7pm. These samples were analysed using the standard operating procedure (SOP) for the LuminUltra qPCR testing regime. SARS-CoV-2 prevalence was expressed as gene units per millilitre (GU/ ml). The viral prevalence was used to predict local population case numbers using the median viral shedding per person throughout infection.



Samples were analysed using SOP for the LuminUltra qPCR testing regime

At each site the measured data was provided to the company the same day. The data was provided to a nominated person with the company. Untap provided recommendations to the company, depending on the level of risk of the viral prevalence data. Data is presented with the below ‘traffic-light’ legend; low risk is teal, medium risk is amber and high risk is fuchsia. Data is presented alongside the company’s reported COVID-19 absence data.

- Low risk is zero measured cases in the local population, Untap recommendations include continuation of monitoring.
- Medium risk is 1-3 cases in the local population, Untap recommendations include improving ventilation, lateral flow testing and increasing mask-wearing communal spaces.
- High risk is over 4 cases in the local population, Untap recommendations include those from medium risk, reducing shared-room capacities and other social distancing measures.



RESULTS

At site 1, on Thursday 18th November the measured viral prevalence was 48 GU/ml, giving a predicted number of 1 – 3 cases. On Friday 19th November, 1 employee tested positive for COVID-19.

At site 2, on Thursday 6th January the measured viral prevalence was 111 GU/ml, giving a predicted number of 1 - 3 cases. On Friday 7th January, 1 employee tested positive for COVID-19, and on Sunday 9th January another employee tested positive for COVID-19. On Thursday 20th January the measured viral prevalence was 49 GU/ml, giving a predicted number of 1 - 3 cases. On Sunday 23rd January, 1 employee tested positive for COVID-19.

CONCLUSION

Untap’s wastewater data has been used at sites with smaller and larger occupancy, to predict COVID-19 cases in the workplace. This data was then used to implement recommendations which identified these cases. Early detection of individual COVID-19 cases in the workplace reduced transmission and therefore minimised workplace absences. This detection is likely to have a bigger impact on a smaller occupancy workplace due to the limited surge capacity.

This case study shows that wastewater analysis for SARS-COV-2 can identify asymptomatic and pre-symptomatic individual before they test positive for the virus through naso-pharyngeal swab tests. This system is easy to implement and totally non-intrusive to the day-to-day operations of the organisation.

DATA

Untap’s measured SARS-CoV-2 prevalence, predicted COVID-19 case numbers and company reported COVID-19 absences at site 1

Date	Time	Untap GU/ml	Untap Estimated Case Numbers	Reported COVID-19 absences
Thurs Nov 18th	PM	48	1 - 3	
Fri Nov 19th				1

Untap’s measured SARS-CoV-2 prevalence, predicted COVID-19 case numbers and company reported COVID-19 absences at site 2

Date	Time	Untap GU/ml	Untap Estimated Case Numbers	Reported COVID-19 absences
Weds Jan 5th	AM	0	0	0
Weds Jan 5th	PM	0	0	0
Thurs Jan 6th	AM	127	1 - 3	0
Thurs Jan 6th	PM	99	1 - 3	0
Fri Jan 7th	AM	0	0	1
Fri Jan 7th	PM	0	0	1
Mon Jan 10th	AM	0	0	2
Mon Jan 10th	PM	0	0	2
Tue Jan 11th	AM	0	0	2
Tue Jan 11th	PM	0	0	2
Weds Jan 12th	PM	0	0	2
Thurs Jan 13th	AM	0	0	2
Thurs Jan 13th	PM	0	0	2
Fri Jan 14th	AM	0	0	2
Fri Jan 14th	PM	0	0	2
Mon Jan 17th	AM	0	0	0
Mon Jan 17th	PM	0	0	0
Tue Jan 18th	AM	0	0	0
Tue Jan 18th	PM	0	0	0
Weds Jan 19th	AM	0	0	0
Weds Jan 19th	PM	0	0	0
Thurs Jan 20th	AM	0	0	0
Thurs Jan 20th	PM	49	1 - 3	0
Fri Jan 21st	AM	0	0	0
Fri Jan 21st	PM	0	0	0
Mon Jan 24th				1

REFERENCES

- [1] Innovation in wastewater near-source for rapid identification of COVID-19 in schools. Available from: [https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247\(20\)30193-2/fulltext](https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247(20)30193-2/fulltext)
- [2] Suppression of a SARS-CoV-2 outbreak in the Italian municipality of Vo’. Available from: <https://www.nature.com/articles/s41586-020-2488-1?fbclid=IwAR0Y69FXQqJqogOf-1InHI6fi25CSuM1q4zJEpfFMVZalSsOnS3W7vxcUOM>
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