



Untap forecasts Municipal Scale COVID-19 Case Numbers in line with Government Published Statistics

Untap Ltd measured SARS-CoV-2 prevalence in wastewater at a municipal wastewater treatment site. The measured viral prevalence was converted to case numbers. The regional COVID-19 seven-day average per 100,000 population data were taken from local government published statistics and converted to case numbers. The Untap measured case numbers were in line with the government published results. Through monitoring the wastewater, Untap forecasts local COVID-19 case numbers.

INTRODUCTION

Wastewater monitoring for the presence of SARS-CoV-2 is applied on a municipal scale to capture both symptomatic and asymptomatic cases of COVID-19. This has already been implemented by governments across Europe, including the UK and France, and in North America. It has been effective in predicting the trend of new case numbers of COVID-19 [1]; so much so, that the European Union has put in place a directive that towns over 150,000 population should monitor their municipal wastewater plants for SARS-CoV-2 [2]. Wastewater testing for SARS-CoV-2 presents earlier detection of RNA signals, as opposed to naso-/ oro-pharyngeal swab samples (i.e., lateral flow and PCR testing) [3]. The tracking of SARS-CoV-2 in wastewater can generate results in real-time, whilst being significantly more cost-effective than individual clinical testing, allowing the detection of hotspots during an outbreak [4].

METHOD

Untap collected wastewater from a United Kingdom municipal wastewater treatment site, with a contributing population of 1,976. Manual-sampling was chosen as the collection method. Immediate, on-site analysis was performed using the portable LuminUltra qPCR testing regime, to achieve sample-to results in less than 3 hours. SARS-CoV-2 prevalence was expressed as gene units per millilitre (GU/ml). Regional COVID-19 seven-day average per 100,000 data were taken from local government published statistics.



Wastewater collected using manual-sampling method

RESULTS

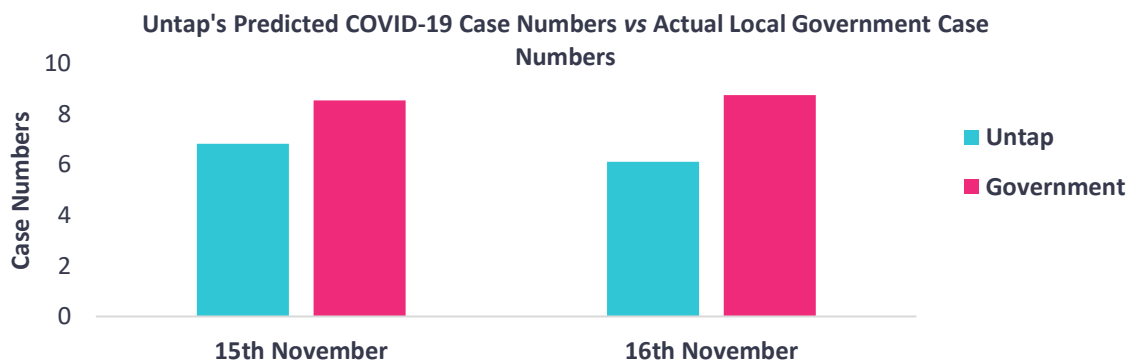
Wastewater is used as a predictive metric for the SARS-CoV-2 positivity rate using the regional seven-day average per 100,000 population [5],[6]. Untap’s measured viral prevalence can be translated into case numbers using the median viral shedding per person. The regional seven-day average per 100,000 population can be translated into case numbers using the local contributing population of 1,976.

Untap’s wastewater SARS-CoV-2 prevalence data expressed as GU/ml with regional 7-day average

Date	Time	Untap GU/ml	Regional 7-Day Average/100,000
15 th Nov 2021	09:00	223	432
16 th Nov 2021	13:00	200	443

$$\frac{\text{Untap measured viral prevalence (GU/ml)}}{\text{Median viral prevalence per person (GU/ml)}} = \text{Untap Predicted Case Numbers}$$

$$\frac{\text{Regional 7 – day average/100,000 pop.}}{100,000} = \text{Local Government Published Case Numbers}$$



CONCLUSION

On November 15th, Untap predicted 7 cases of COVID-19, and the local published government statistics of 9 cases. On November 16th, Untap predicted 6 cases of COVID-19, and the local published government statistics of 9 cases. The local government published case numbers are directly comparable to the predicted case numbers by Untap. It must be noted that the regional seven-day average per 100,000 population is all reported cases of COVID-19 in that period, whereas Untap's method at this site shows the SARS-CoV-2 prevalence at a snapshot in time. This accounts for the small disparity in the Untap predicted results, versus the government published data.

This data shows that the LuminUltra analysis of SARS-CoV-2 levels in wastewater is reliable in detecting COVID-19 case numbers.

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