# COVID-19 Prediction Using Wastewater Surveillance Data

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| Category | Parameter/Feature | Description |
| Input Parameters | SARS-CoV-2 Concentration in Wastewater | Viral RNA levels in wastewater samples provide early indicators of infection rates. |
|  | Sampling Frequency and Locations | Regular collection from key sites ensures data representativeness and temporal accuracy. |
|  | Population Data | The population served by each wastewater plant helps normalize viral concentrations. |
|  | Environmental Factors | Temperature, precipitation, and wastewater flow rates can influence viral RNA detection. |
| Output Parameters | COVID-19 Case Counts | Predicts the number of confirmed COVID-19 cases in a community. |
|  | Hospitalization Rates | Estimates the number of COVID-19-related hospital admissions. |
|  | Mortality Rates | Forecasts the number of deaths attributed to COVID-19. |
|  | Emergency Department (ED) Visits | Predicts the percentage of ED visits related to COVID-19 symptoms. |
|  | Test Positivity Rates | Estimates the proportion of positive COVID-19 tests among those tested. |
| Machine Learning Features | Temporal Lag Analysis | Incorporates time lags between changes in wastewater viral concentrations and shifts in clinical metrics. |
|  | Demographic Information | Includes age distribution, underlying health conditions, and vaccination coverage. |
|  | Healthcare Capacity Metrics | Data on hospital bed availability and healthcare staffing levels provide context for hospitalization predictions. |
|  | Public Health Interventions | Factors in the impact of mask mandates, social distancing, and vaccination campaigns on transmission rates. |