Sensitivity of proposed UK sentinel GP COVID-19 surveillance

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We simulate an uncontrolled COVID-19 epidemic with the parameters in Table 1 and calculate the sensitivity of the proposed sentinel RCGP surveillance network to detect transmission, the precision of the incidence estimates achieved in the absence of capacity limits, and the likely period during which ICU capacity is exceeded.

Table 1: Model parameters

Proposed sentinel RCGP virology network catchment population size	1,052,324
RCGP syndromic surveillance network catchment size	2,500,000
Proportion of symptomatic infections consulting GP	0.17
Baseline ILI+LRTI swabs per week	250
Background ILI+LRTI per week/100k	50
R_0 of COVID-19	2.1
Generation time of COVID-19	6.5 days
Proportion of infections symptomatic	0.66

Precision is expressed as the probability the observed incidence is within +/- 10% of the true incidence, calculated via the delta method via the product of syndromically diagnosed ILI+LRTI and the proportion of ILI+LRTI virological specimens testing positive.

We estimate that the proposed sentinel ICU surveillance network would detect COVID-19 cases from 10 weeks prior to the peak of the epidemic (Figure 1).

If virological testing was scaled to 1000 samples per week, detection and >90% precision would be attained 9 days earlier (Figure 2).

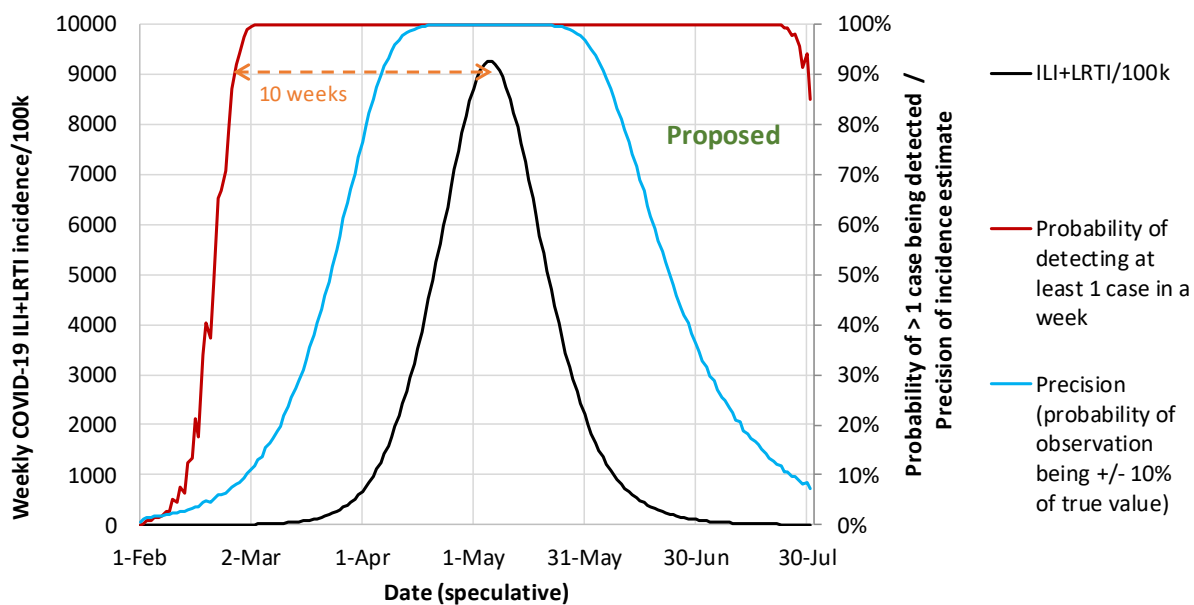**Figure 1: Estimated sensitivity of proposed RCGP sentinel surveillance**

Figure 2: Estimated sensitivity of proposed RCGP sentinel surveillance