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# Modeling Assumptions

The following tables detail the assumptions used in the model.

**Table S1: Assumptions for processing times, arrival rates, batches and shifts**

| Parameter   | Assumption                           | Distribution              | Units for Distribution |
|---|--------------------------------------|---------------------------|------------------------|
| School/workplace patient arrival rate                   | Poisson process ~9,240 arrivals/week | Poisson process ~9,240    | arrivals/week          |
| Community testing patient arrival rate                  | Poisson process ~9,240 arrivals/week | Poisson process ~9,240    | arrivals/week          |
| Nursing homes sample arrival rate                       | Poisson process ~8,400 arrivals/week | Poisson process ~8,400    | arrivals/week          |
| Match/Create EPIC record processing time                | 4 minutes/patient                    | triangular(3,4,5)         | minutes/sample         |
| Match Requisition (school/workplace) processing time    | 30 secs/patient                      | triangular(25,30,35)      | seconds/sample         |
| Sample Collection (school/workplace) processing time    | 30 secs/sample                       | triangular(25,30,35)      | seconds/sample         |
| Sample Collection (community) processing time           | 30 secs/sample                       | triangular(25,30,35)      | seconds/sample         |
| Sample Accessioning (rapid) (community) processing time | 30 secs/sample                       | triangular(25,30,35)      | seconds/sample         |
| Sample Accessioning (nursing homes) processing time     | 3-5 mins/sample                      | triangular(3,5,6)         | minutes/sample         |
| Manifest building processing time                       | 5 mins per 100 samples               | triangular(3,3.5,5)       | seconds/sample         |
| Rack Samples processing time                            | 1-2 secs /sample                     | triangular(0,1,2)         | seconds/sample         |
| Scan Barcode processing time                            | 30 secs/rack of 24 samples           | triangular(24,30,36)      | seconds/rack           |
| Uncapping processing time                               | 3 secs/sample                        | triangular(67.2,72,84)    | seconds/rack           |
| Deswabbing processing time                              | 3-30 secs/sample                     | triangular(1.2,3,10)      | minutes/rack           |
| STARlet processing time                                 | 15 mins/plate of 96 samples          | triangular(14.5,15,15.5)  | minutes/plate          |
| STAR processing time                                    | 1.5 hours/ 4x plates of 96 samples   | triangular(1.45,1.5,1.55) | hours/plate            |
| Mosquito processing time                                | 8 mins/batch                         | triangular(7.8,8,8.5)     | minutes/plate          |
| qPCR processing time                                    | 1.25 hours/batch                     | triangular(1.24,1.25,1.3) | hours/batch            |

|   |                       |                          |                |
|---|-----------------------|--------------------------|----------------|
| <b>Sample Retrieval processing time</b>           | 1.25 minutes / sample | triangular(1.1,1.25,1.3) | minutes/sample |
| <b>Export Data processing time</b>                | 4 mins/ batch         | triangular(3.5,4,4.5)    | minutes/batch  |
| <b>Manual Verification processing time</b>        | 15 secs/ sample       | triangular(15,16,17)     | seconds/sample |
| <b>Rack Sample batch size</b>                     | 24 samples per batch  | 24                       | samples        |
| <b>STARlet batch size</b>                         | 96 samples per batch  | 96                       | samples        |
| <b>STAR batch size</b>                            | 384 samples per batch | 384                      | samples        |
| <b>qPCR batch size</b>                            | 96 samples per batch  | 96                       | samples        |
| <b>Shipping from Colleges batch size</b>          | 250 samples per batch | triangular(100,250,600)  | samples        |
| <b>Shipping form community testing batch size</b> | 250 samples per batch | triangular(100,250,600)  | samples        |
| <b>Positivity rate</b>                            | 1.20%                 | 1.2                      | percent        |
| <b>Inconclusive test rate</b>                     | 2.30%                 | 2.3                      | percent        |
| <b>Lab shift length</b>                           | 8 hours               | 8                        | hours          |
| <b>Accessioning shift length</b>                  | 24 hours              | 24                       | hours          |

**Table S2: Assumptions for number of resources**

| <b>Resource Capacities</b>                     | <b>Assumption</b> |
|--|-------------------|
| <b>Sample Accessioning (rapid) (community)</b> | 33 technicians    |
| <b>Sample Accessioning (nursing homes)</b>     | 33 technicians    |
| <b>Manifest Building</b>                       | 2 supervisors     |
| <b>Rack Samples</b>                            | 2 technicians     |
| <b>Scan Barcode</b>                            | 2 technicians     |
| <b>Uncapping</b>                               | 2 technicians     |
| <b>Deswabbing</b>                              | 2 technicians     |
| <b>STARlet</b>                                 | 3 instruments     |
| <b>STAR</b>                                    | 6 instruments     |
| <b>Mosquito</b>                                | 3 instruments     |
| <b>qPCR</b>                                    | 16 instruments    |