

Simulation Modelling for Increased Genetic Testing Capacity

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IMPACT OF PROPOSED INTERVENTIONS BY EOY 2024:

CURRENT PROCESS

87.7% TAT - 2.3% BELOW Target
\$1,456,894.53 CAD in Testing Cost
1306 Throughput

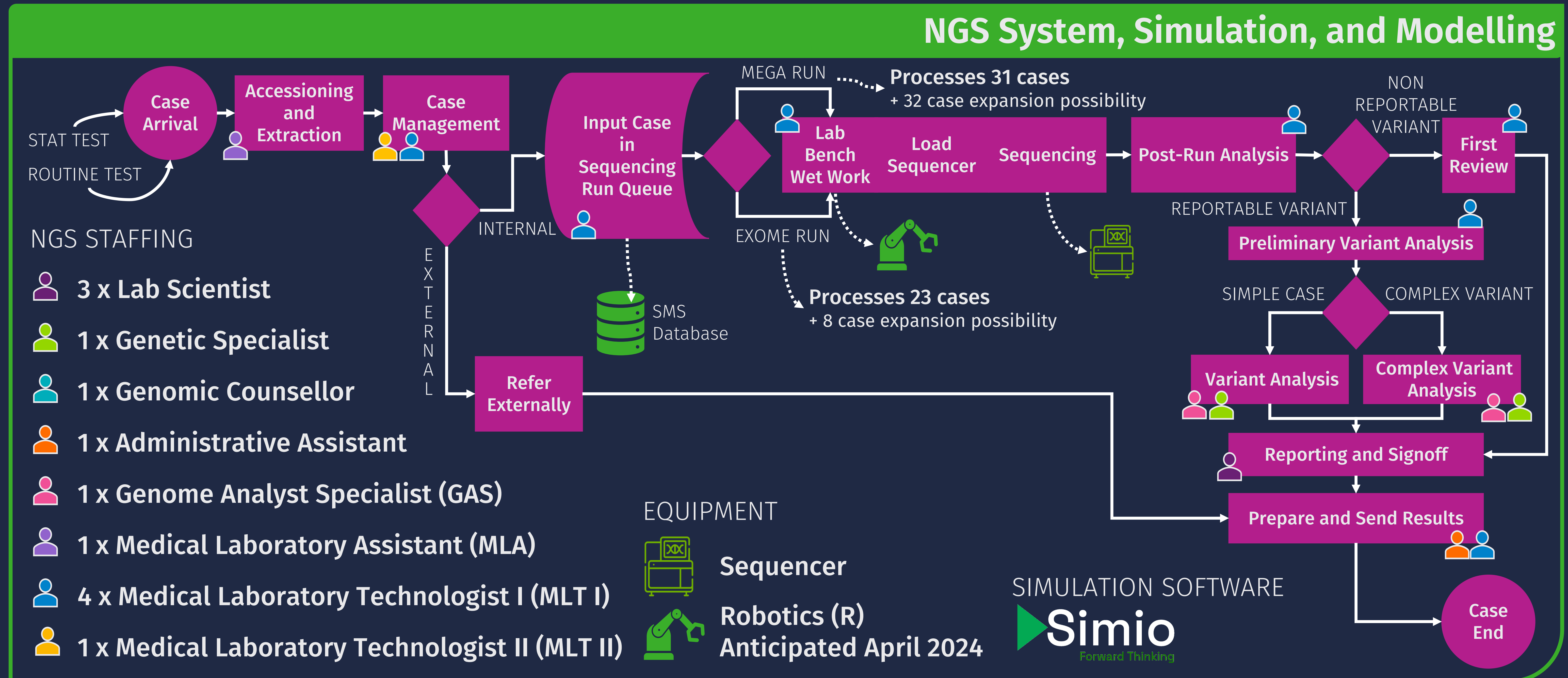
PROJECTED
~180K CAD
ANNUAL SAVINGS

20.6%
MORE CASES
COMPLETED

RECOMMENDED INTERVENTION
7.5% ABOVE Target - 97.5% TAT
\$1,275,616.37 CAD in Testing Cost
1574 Throughput

Context

- Clinical Genomics Lab (CGL)
- Provides integrated cytogenetic and molecular testing for pediatric and adult mendelian disorders
- Located in Halifax N.S. servicing the Maritime Provinces
- Open Weekdays: 7 a.m. – 5 p.m. Saturday: 8 a.m. – 4 p.m.
- Field is rapidly progressing with advances in genome diagnostics: increasing application of Next Generation Sequencing (NGS) generating increased demand



Problem, Aim, and Goals

The CGL is at their testing capacity and must refer cases externally to meet demand at the expense of the lab.

AIM

- Recommend how the CGL can best service increasing demand
- Use simulation to test interventions

GOALS

- Increase NGS testing capacity
- Repatriate externally-referred tests
- Maintain minimum 90% TAT target

Simulation Interventions and Results

Scenario	Internal Throughput	TAT Compliance	Stat Avg. TIS (Days)	Routine Case Avg. TIS (Days)
2023 Validation	1313	90.9%	18.78	20.27
2024 Current Process	1306	87.7%	24.39	26.02
2024 + R + 1 GAS	1343	89.8%	19.65	21.08
2024 Exome Only + R + GAS + Cap. 31	1433	99.0%	12.92	14.05
^ and Repatriate All	1574	97.5%	16.69	19.10
2025 Exome Only + R + GAS + Cap. 31	1560	99.2%	14.07	15.68
^ and Repatriate All	1738	98.4%	15.51	18.44

Recommendations

An additional GAS and MLTI should be hired, robotics implemented, the NGS testing batch capacity increased to 31 and all cases run on Exome to allow for 100% of eligible NGS referred tests to be repatriated.