**Obstetrics Management Suite: Facility Constraints Simulation**

**Background**

Per 2016-2017 contract, it was requested that IPS perform a simulation to identify how many births per month a client hospital can perform based on its current number of facilities. Specifically, we will address how the “census”, or occupancy, of the facilities would be affected by an increase in birth volume, and how waiting time at particular stages would be affected.

**Assumptions**

Patient Flows

Nine major patient pathways were identified.

1. Unscheduled SVDs/inductions

2. Scheduled SVDs/inductions

3. Unscheduled patients beginning as inductions who deliver via c-section

4. Scheduled patients beginning as inductions who deliver via c-section

5. Scheduled c-sections beginning in pre-op

6. Unscheduled c-sections beginning in pre-op

7. Unscheduled c-sections bypassing pre-op

8. Scheduled c-sections bypassing pre-op

9. Unscheduled patients entering post-partum

These “patient flows” were simulated based on their frequency of entering the L&D ward, in ADT data tracked with our CSS tool. Scheduled c-sections and inductions and their frequencies were taken from S3. The amount of time that particular patients stay at particular facilities (i.e. how much time a scheduled c-section patient spends in the operating room) was used.

Facilities

The simulation covers five rooms: delivery room (11 beds), c-section pre/post-op (4 beds) operating room (4 beds), uncomplicated post-partum (19 beds), and complicated post-partum (20 beds). The focus will be on the delivery room and on the post-partum wings, because these are so much closer in the current state to being occupied to capacity.

**Timeframe**

The simulation was run over a period of 156 weeks (three years). Validation was done to ensure that the simulated census was similar to the true census, and that the modeled numbers of unscheduled and scheduled arrivals also resemble reality.

**Results**

We explore the current state (0% increase in birth volume), and what we expect to occur at various increases (3%, 6%, etc.) Peak hours of the week are Wednesday, Thursday, and Friday afternoons.

All of these results are presented in order to let the reader use their judgment as to when a given birth volume increase is too much to handle. **However, it is our suggestion that while a small increase such as 3-6% is probably acceptable, larger increases such as 12% could greatly increase risk to patient safety and patient satisfaction.**

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| **Volume increase** | **Waiting time** | **Census** |
| 0% (Current state, ~250 births per month) | 1% of patients experience some wait time | Delivery room and uncomplicated post-partum rarely near capacity; complicated post-partum never close to capacity |
| 3% (7-8 additional births per month) | 2% of patients experience some wait time | Delivery room and uncomplicated post-partum rarely at capacity but almost never over capacity |
| 6% (14-16 additional births per month) | 2.5% of patients experience some wait time | Delivery room and uncomplicated at or near capacity at some peak hours of the week about 5% of the time |
| 9% (21-24 additional births per month) | 2.5% of patients experience some wait time; 2% of patients experience a wait time of longer than 20 minutes | Delivery room at capacity around 5% of the time on Wednesdays; uncomplicated post-partum at or over capacity 5% of the time at peak hours of week |
| 12% (28-32 additional births per month) | 4% of patients experience some wait time; 3% of patients experience a wait time of longer than 30 minutes | Delivery room at or over capacity around 5% of the time on Wednesdays; uncomplicated post-partum at or over capacity 10% of the time at peak hours of week |
| 15% (35-40 additional births per month) | 4% of patients experience some wait time; 3% of patients experience a wait time of longer than one hour | Delivery room at or over capacity around 5% of the time at all peak hours of week; uncomplicated post-partum at or over capacity 10% of the time at peak hours of week |