# Inputs Parameters

This is for the “smaller instance” of the problem:

* Planning horizon is decreased from 24 weeks to 10 weeks
* Maximum tracked wait is decreased from 6 weeks to 4 weeks
* There are 3 surgeries instead of 6 surgeries
* Number of priorities is set to 1

Simulation parameters: 30 replications, 1250 weeks duration, 250 weeks warm up.

Arrival Rate:

It was set to be 95% of the capacity, however due to transitions, the resource usage should be higher than 95%

Surgeries:

* 1. SPINE POSTERIOR DECOMPRESSION/LAMINECTOMY LUMBAR
* 4. SPINE POST CERV DECOMPRESSION AND FUSION W INSTR
* 6. SPINE POSTERIOR DISCECTOMY LUMBAR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Surgery** | **Complexity** | **Arrival per week -**  **Adjusted to capacity**  **(poisson)** | **Arrival per week –**  **Initial**  **(poisson)** | **Rationale** |
| Surgery 1 | Complexity 1 | 1.231988473 | 1 | once per week |
| Surgery 1 | Complexity 2 | 0.615994236 | 0.5 | once per two weeks |
| Surgery 4 | Complexity 1 | 0.143731988 | 0.083333333 | once per 3 months |
| Surgery 4 | Complexity 2 | 0.102665706 | 0.0625 | once per 4 months |
| Surgery 6 | Complexity 1 | 1.231988473 | 1 | once per week |
| Surgery 6 | Complexity 2 | 0.615994236 | 0.5 | once per 2 weeks |

Usage of the resources:

|  |  |  |  |
| --- | --- | --- | --- |
| **Surgery** | **Complexity** | **Resource type** | **Usage** |
| 1. SPINE POSTERIOR DECOMPRESSION/LAMINECTOMY LUMBAR | Complexity 1 | Admissions | 0 |
| 1. SPINE POSTERIOR DECOMPRESSION/LAMINECTOMY LUMBAR | Complexity 1 | OR\_Time | 3 |
| 1. SPINE POSTERIOR DECOMPRESSION/LAMINECTOMY LUMBAR | Complexity 2 | Admissions | 1 |
| 1. SPINE POSTERIOR DECOMPRESSION/LAMINECTOMY LUMBAR | Complexity 2 | OR\_Time | 4 |
| 4. SPINE POST CERV DECOMPRESSION AND FUSION W INSTR | Complexity 1 | Admissions | 1 |
| 4. SPINE POST CERV DECOMPRESSION AND FUSION W INSTR | Complexity 1 | OR\_Time | 4 |
| 4. SPINE POST CERV DECOMPRESSION AND FUSION W INSTR | Complexity 2 | Admissions | 1 |
| 4. SPINE POST CERV DECOMPRESSION AND FUSION W INSTR | Complexity 2 | OR\_Time | 5.5 |
| 6. SPINE POSTERIOR DISCECTOMY LUMBAR | Complexity 1 | Admissions | 0 |
| 6. SPINE POSTERIOR DISCECTOMY LUMBAR | Complexity 1 | OR\_Time | 1.5 |
| 6. SPINE POSTERIOR DISCECTOMY LUMBAR | Complexity 2 | Admissions | 0 |
| 6. SPINE POSTERIOR DISCECTOMY LUMBAR | Complexity 2 | OR\_Time | 2.5 |

System Capacity:

|  |  |
| --- | --- |
| **Resource** | **Capacity per week** |
| Admissions | 1.5 (patient admissions per week – requiring a bed) |
| OR Time | 11.25 (OR hours per week) |

# Description of the Policy (MDP): NEED TO FIX GRAPHS

### The policy description is based on the following graph.

This graph shows the benefit of scheduling a patient divided by the resource utilization. If it is above 0, it is better to schedule a patient than to let a patient wait. The highest points on the graph should be scheduled first.

Only the first two weeks will be scheduled into.

### There are also minor preference towards patients who waited longer (complexity 1 only)

### Description

* This plot shows that the policy would only schedule on week 1 and 2. (For all weeks after it is below 0).
* First the policy would attempt to fill week 1, then it attempts to fill week 2
  + For week 1 the policy attempts to fill the system in approximately the following order:
    - Surgery 6, Complexity 1
    - Surgery 1, Complexity 1
    - Surgery 6, Complexity 2
    - Surgery 4, Complexity 1
    - Surgery 4, Complexity 2
    - Surgery 1, Complexity 2
  + For week 2 the policy attempts to fill the system in approximately the following order:
    - Surgery 6, Complexity 1
    - Surgery 1, Complexity 1
    - Surgery 4, Complexity 1
    - Surgery 6, Complexity 2
    - Surgery 1 Complexity 2 OR Surgery 4 Complexity 2

# Result Tables

Wait Times in weeks (mean +- 95% margin of error):

Surgeries:

* 1. SPINE POSTERIOR DECOMPRESSION/LAMINECTOMY LUMBAR
* 4. SPINE POST CERV DECOMPRESSION AND FUSION W INSTR
* 6. SPINE POSTERIOR DISCECTOMY LUMBAR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Overall | Surgery | | |
|  |  | Surgery 1 | Surgery 4 | Surgery 6 |
| MDP | 7.54 +- 9.83 | 14.7 +- 13.8 | 5.65 +- 2.76 | 0.556 +- 0.217 |
| Myopic | 14.9 +- 14.0 | 27.4 +- 19.3 | 17.6 +- 4.40 | 1.92 +- 0.714 |

Wait List Size in number of patients (mean +- 95% margin of error):

Surgeries:

* 1. SPINE POSTERIOR DECOMPRESSION/LAMINECTOMY LUMBAR
* 4. SPINE POST CERV DECOMPRESSION AND FUSION W INSTR
* 6. SPINE POSTERIOR DISCECTOMY LUMBAR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Overall | Surgery | | |
|  |  | Surgery 1 | Surgery 4 | Surgery 6 |
| MDP | 30.3 +- 0.81 | 27.9 +- 0.813 | 1.14 +- 0.146 | 1.02 +- 0.0863 |
| Myopic | 59.1 +- 2.04 | 51.3 +- 2.15 | 4.34 +- 0.150 | 3.53 +- 0.106 |

Utilization (mean +- 95% margin of error):

|  |  |  |
| --- | --- | --- |
|  | Admissions | OR Time |
| MDP | 0.570 +- 0.140 | 0.948 +- 0.0711 |
| Myopic | 0.631 +- 0.124 | 0.954 +- 0.0682 |

Percentage of patients rescheduled (mean +- 95% margin of error):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Overall | Surgery | | |
|  |  | Surgery 1 | Surgery 4 | Surgery 6 |
| MDP | 2.62 +- 0.293 | 3.62 +- 0.561 | 5.64 +- 1.75 | 1.21 +- 0.326 |
| Myopic | 12.8 +- 0.958 | 15.0 +- 1.22 | 72.1 +- 12.4 | 2.73 +-- 0.327 |

Percentage of patients transitioned (mean +- 95% margin of error):

* Number of patients whose conditions worsened (complexity only)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Overall | Surgery | | |
|  |  | Surgery 1 | Surgery 4 | Surgery 6 |
| MDP | 1.12+-0.246 | 0.861+-0.3 | 10.8+-2.48 | 0.109+-0.0817 |
| Myopic | 8.46+-0.955 | 10.5+-1.23 | 41+-5.33 | 2.48+-0.579 |

# Some Graphs:

