Veterans Health Administration

PROCESS CAPABILITY ANALYSIS

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Process Capability Analysis

• To check if the organization’s process meets its quality standards

• Estimators: Process capability ratio $C_p$, Capability Index $C_{pk}$
Problem Statement

**Process**
- Time from Patient applying for VA medical benefits until the first doctor’s visit.

**Problem Statement**
- Time taken for Veterans to receive first medical appointment after registration is too long.
Problem Areas

- Veteran status check
- Disability Check
- Shortage of employees to process the applications
- Unavailability or Shortage of Specialists
Process Flow

- **Start**
  - Patient Makes Application for Medical care
- **Application**
  - Is Processed
  - Patient is notified of appointment.
  - Is Physician available?
- **Yes**
  - Doctor Diagnoses
  - Treatment
  - End
- **No**
  - Treatment
  - End
Process Capability Report for Wait time (Before)

Process Data
- LSL: 2
- Target: *
- USL: 11
- Sample Mean: 7.13213
- Sample N: 100
- StDev(Overall): 2.44379
- StDev(Within): 2.41861

Overall Capability
- Pp: 0.61
- PPL: 0.70
- PPU: 0.53
- Ppk: 0.53
- Cpm: *

Potential (Within) Capability
- Cp: 0.62
- CPL: 0.71
- CPU: 0.53
- Cpk: 0.53

Performance

<table>
<thead>
<tr>
<th></th>
<th>Observed</th>
<th>Expected Overall</th>
<th>Expected Within</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPM &lt; LSL</td>
<td>10000.00</td>
<td>17861.36</td>
<td>16921.67</td>
</tr>
<tr>
<td>PPM &gt; USL</td>
<td>100000.0</td>
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<td>54886.43</td>
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<tr>
<td>PPM Total</td>
<td>110000.0</td>
<td>74602.05</td>
<td>71808.10</td>
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</table>
Process Capability Sixpack Report for Wait time (Before)

I Chart

- Individual Value
- UCL = 14.39
- LCL = 0.12
- $\bar{X} = 7.13$

Moving Range Chart

- Moving Range
- UCL = 8.91
- LCL = 0
- $\bar{MR} = 2.73$

Last 25 Observations

- Values vs. Observation

Capability Histogram

- Overall and Within
- LSL = 2
- USL = 11

Normal Prob Plot

- AD = 0.694
- P = 0.068

Capability Plot

- Within
- Overall
- $StDev = 2.419$
- $Cp = 0.62$
- $Cpk = 0.53$
- PPM = 71808.10

- Overall
- $StDev = 2.444$
- $Pp = 0.61$
- $Ppk = 0.53$
- PPM = 74602.05

Specs
Process Capability Report for Wait time (After)

Process Data

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LSL</td>
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</tr>
<tr>
<td>Target</td>
<td>*</td>
</tr>
<tr>
<td>USL</td>
<td>11</td>
</tr>
<tr>
<td>Sample Mean</td>
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<tr>
<td>Sample N</td>
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<tr>
<td>StDev(Overall)</td>
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<td>StDev(Within)</td>
<td>1.88054</td>
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Overall Capability

- Pp 0.75
- PPL 0.75
- PPU 0.75
- Ppk 0.75
- Cpm *

Potential (Within) Capability

- Cp 0.80
- CPL 0.80
- CPU 0.80
- Cpk 0.80

Performance

<table>
<thead>
<tr>
<th>PPM</th>
<th>Observed</th>
<th>Expected Overall</th>
<th>Expected Within</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; LSL</td>
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<td>8362.82</td>
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<td>&gt; USL</td>
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<tr>
<td>Total</td>
<td>40000.00</td>
<td>24791.77</td>
<td>16714.67</td>
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Process Capability Sixpack Report for Wait time (After)

**I Chart**
- Individual Value
- $\bar{X} = 6.50$
- $LCL = 0.86$
- $UCL = 12.14$

**Capability Histogram**
- Specifications:
  - LSL = 2
  - USL = 11
- Overall
- Within

**Moving Range Chart**
- Moving Range
- $\bar{MR} = 2.12$
- $LCL = 0$
- $UCL = 6.93$

**Normal Prob Plot**
- AD: 0.384, P: 0.389

**Last 25 Observations**
- Values

**Capability Plot**
- Overall
  - StDev = 1.881
  - Cp = 0.80
  - Cpk = 0.80
  - PPM = 16714.67
- Within
- Specs
  - Overall
  - StDev = 2.005
  - Pp = 0.75
  - Ppk = 0.75
  - Cpm = *
  - PPM = 24791.77
Conclusion

• The Cpk value of the process has increased from 0.53 to 0.80.
• The improved process is also not recommended because the Cpk value is still low.
THANK YOU