Quality Planning

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The Problem


AND I'VE IMPROVED HEALTHCARE QUALITY BY NINETEEN PERCENT.
DILBERT.COM @SCOTTADAMSSAYS
WHAT IS HEALTH-CARE QUALITY?
I'M NOT ENTIRELY SURE.
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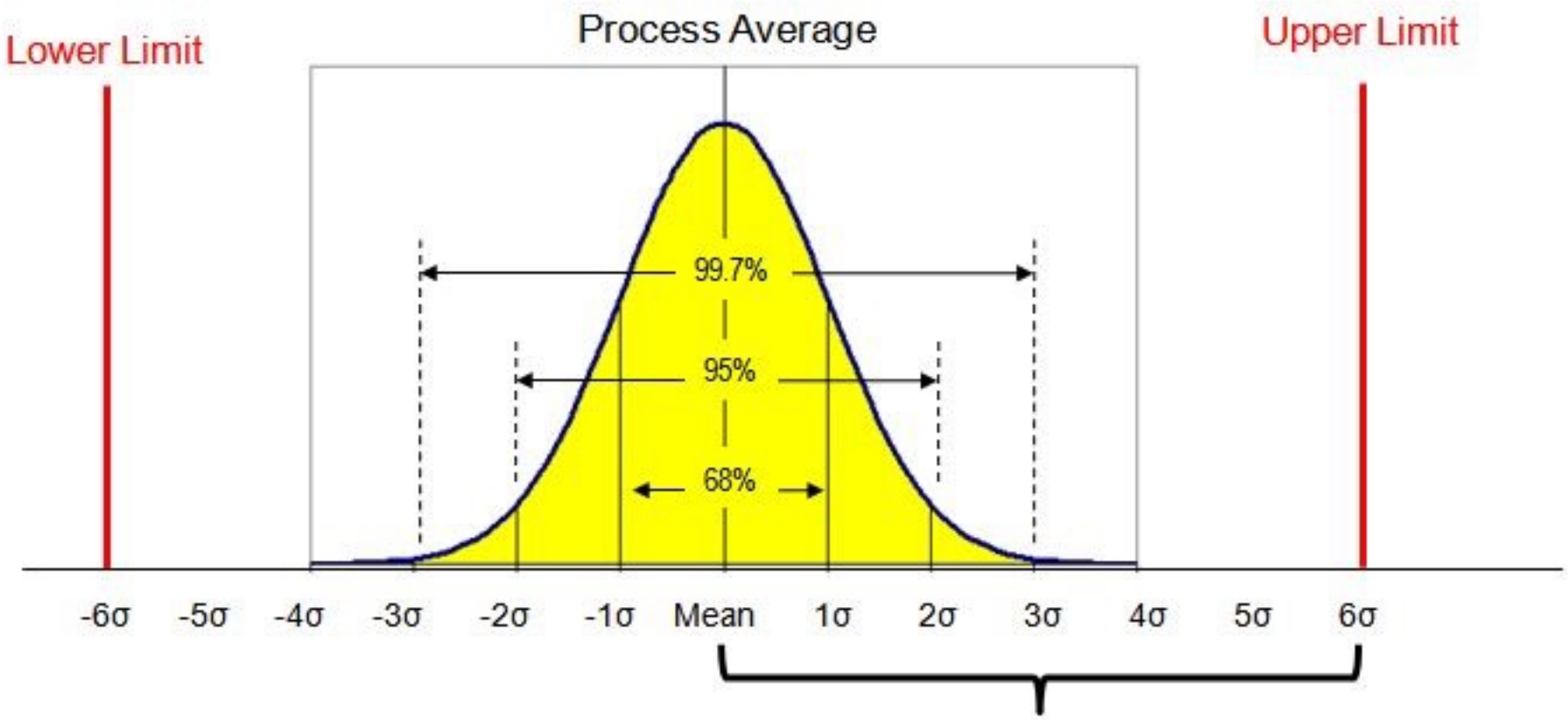
THEN HOW DO YOU MEASURE IT?
HONESTLY, I WASN'T EXPECTING A LOT OF QUESTIONS.

Why Care

The Solution



Quality Planning

- Definition
- Grade
- Statistics
  - Control limits
  - Normal Distribution
  - Standard deviation
- Quality Planning Tools
  - Measurement terminology
    - Tolerances
  - Defining and meeting client expectations
- Quality Assurance

Definition of Quality

- Understand the quality levels expected
- Ensure that the levels are met
  - This includes measuring

Grades as a measure of quality

- Pre-set standards
  - Octane rating for gasoline
  - Lumber graded for appearance, strength
  - Steel and other commodities

Using statistics to measure and manage quality

- Control limits
  - Upper and lower standards for allowable variation
- Central limit theorem
  - Frequency distribution
  - Discrete math— “bins” –count the number of measurements that fall in each bin
  - Normal distribution– “bell-shaped curve”

Measuring your products

- Options:
  - Measure entire population
  - Sampling
    - Smaller amount of data to work with
    - Sometimes measuring destroys the sample

Normal Distribution

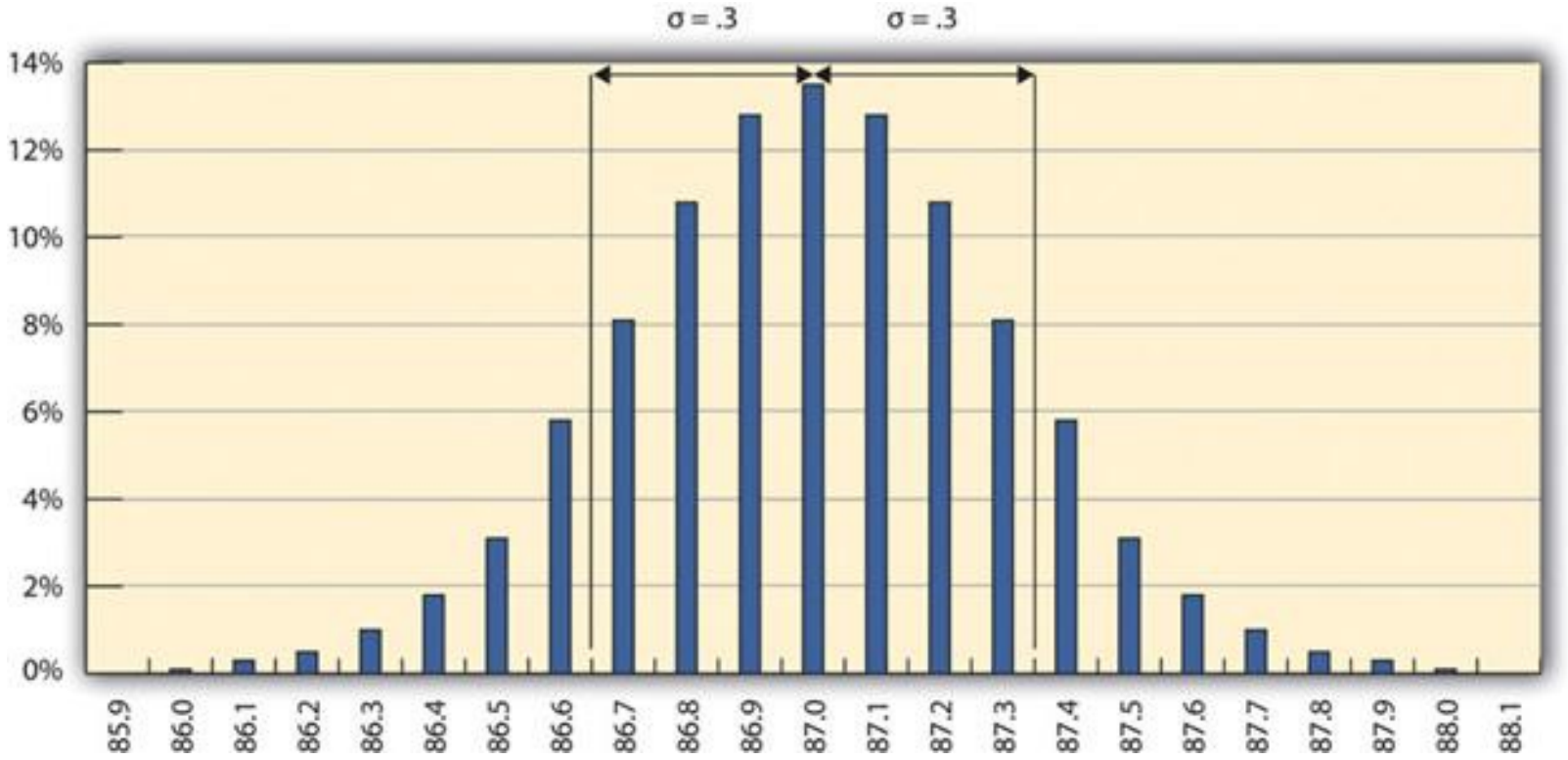


Figure 18.2.2 One Sigma Range
Source: http://pm4id.org/10/1/

Normal Distribution

- Standard deviation
  - Calculate the mean (or average value) of all measurements
  - Subtract EACH measurement from the mean
  - Square EACH difference
  - Sum the values
  - Divide the sum by ((number of values) – 1)
  - Take the square root
- Result can be thought of as the average difference

The 68-95-99.7 Rule

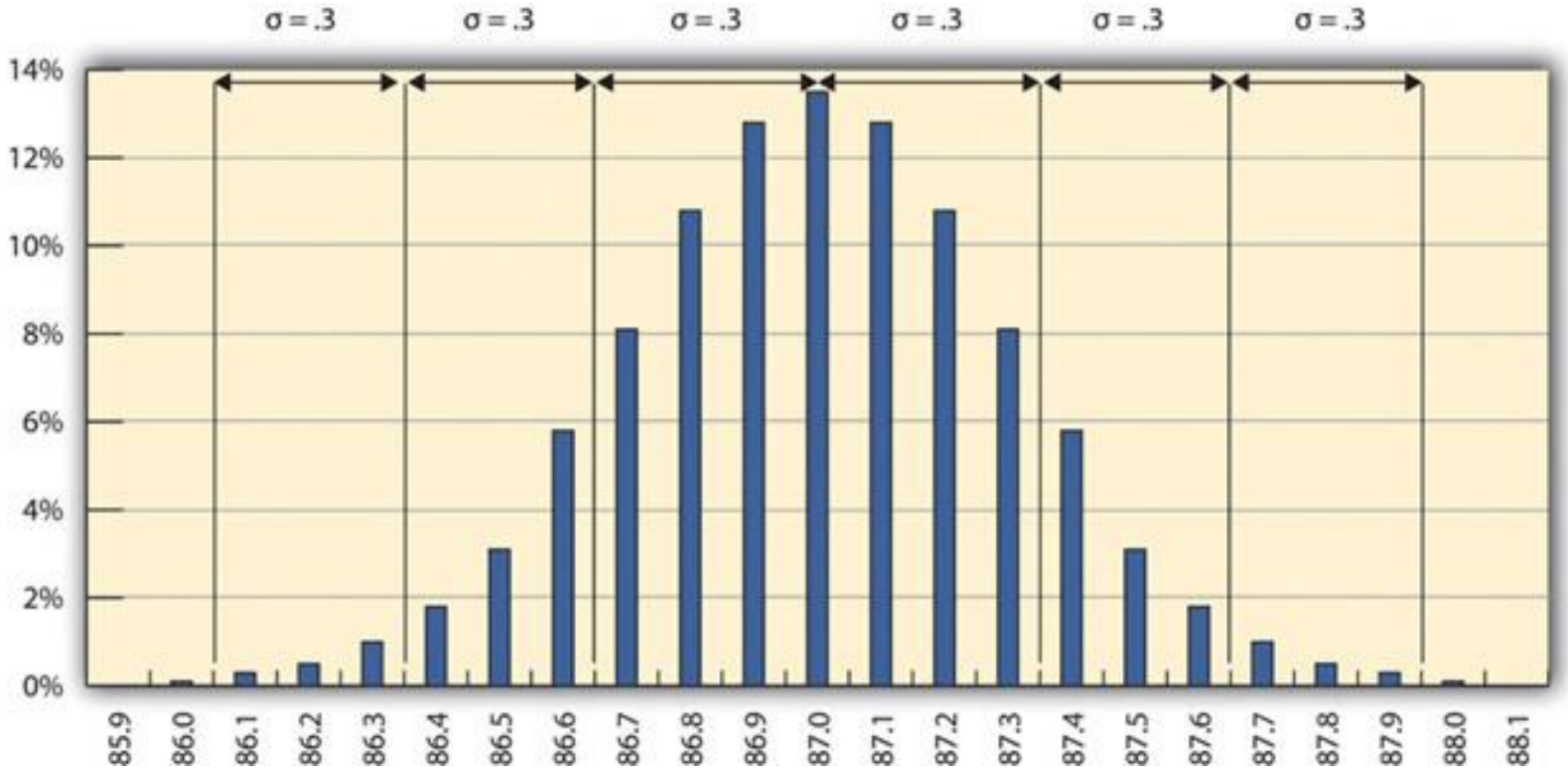


Figure 18.2.3 The 68-95-99.7 Rule
Source: http://pm4id.org/10/1/

Sigma Levels

Standard Deviations between Mean and Either Control Limit	Sigma Level	Percentage Inside Control Limits	Percentage Outside Control Limits	Parts Outside Control Limits (approximate)
1	1	68.3%	31.7%	32 per 100
2	2	95.4%	4.6%	5 per 100
3	3	99.7%	.3%	3 per 1,000
4	4	99.993 7%	.006 3%	4 per 100,000
5	5	99.999 94%	.000 06%	6 per 10 million
6	6	99.999 999 8%	.000 000 2%	2 per billion

Figure 18.2.4 Meaning of Sigma Levels
Source: http://pm4id.org/10/1/

Quality Plan

- The quality plan specifies the control limits
- Often written as the mean ± the acceptable variation
- The size of the range is called the **tolerance**.

Quality planning techniques

- Cost-benefit analysis
- Benchmarking
- Experimentation design
- Cost of quality
- Control Charts
- Cause and Effect diagrams
- Histograms
  - Pareto diagram

Quality Assurance

- Process Analysis
  - ISO 9000 requires this

Summary

- Purpose of Quality Management:
  - Build confidence in clients that quality standards and procedures are being followed
- Ensured by
  - Internal review of plan
  - Testing
  - Revising policies
  - External Review or audit

Homework

- Read and Review Chapters 13 & 14
- Read and Review Supplemental slide decks 10 & 11

Questions?