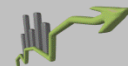


Affirming HOPE results through six sigma statistical techniques

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March 7, 2011



Outline

What is Six Sigma?

Focus of Six Sigma

Design of Experiments & Correlation

Confidence intervals

Applications to HOPE

Summary



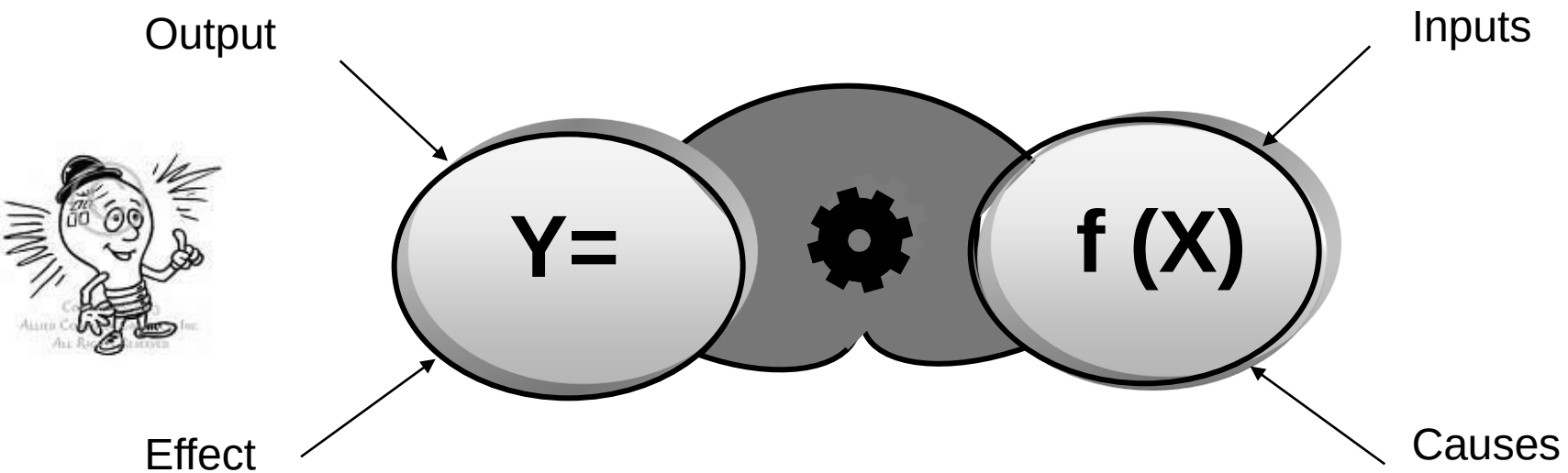
What is Six Sigma?

The term “Sigma” is a *measurement* of how far a given process deviates from perfection – a measure of number of “defects”. “Six Sigma” implies near zero defects (Unwanted consequences)

“A quality *improvement methodology* that applies statistics to measure and reduce variation in processes.”

A *management system* that is “comprehensive and flexible for achieving, sustaining, and maximizing success.”

The Focus of Six Sigma



Poor process performance Y (Effect) is a $f(X : \text{Causes of errors \& waste})$

Poor process performance Y (Improvements) is a $f(X : \text{Actions A, B, C...})$

DOE ...

A DOE (Design of Experiment) is structured method to perform experiments on a process to obtain an accurate model of its transfer function.

In most cases the model is linear, i.e.

$$\bullet y = k_1 + k_2 * A + k_3 * B + k_4 * C \dots$$

It could also be quadratic.

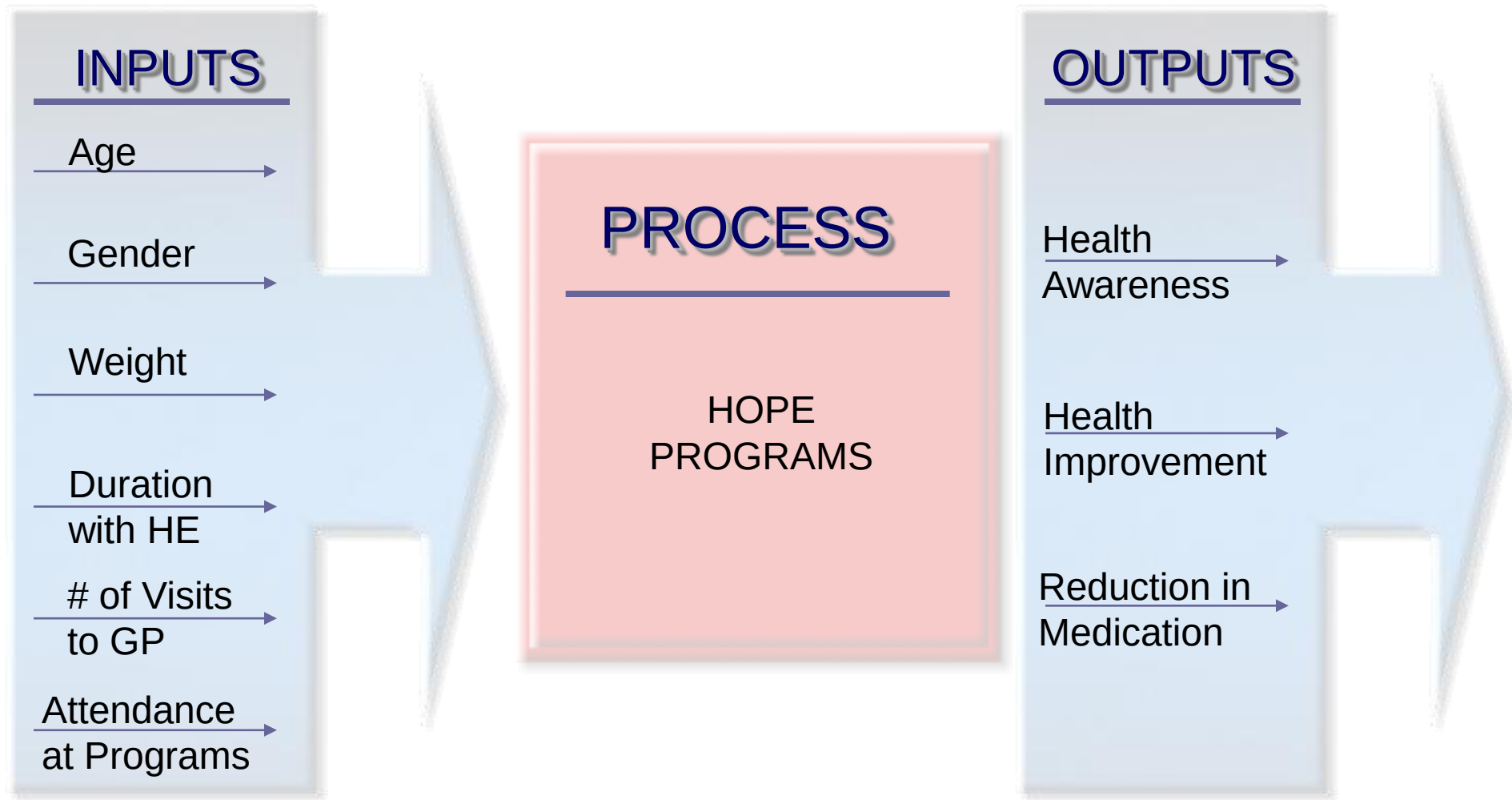
DOE (continue) ...

Stan Jones, PhD, University of Alabama, had his engineering students build an engineering model for the catapult. It took 200 hours, and when they used the model, they had 15% error.

He then had his students learn DOE. In 6 hours, they built a model using the DOE technique. This model had a 1% error in prediction.

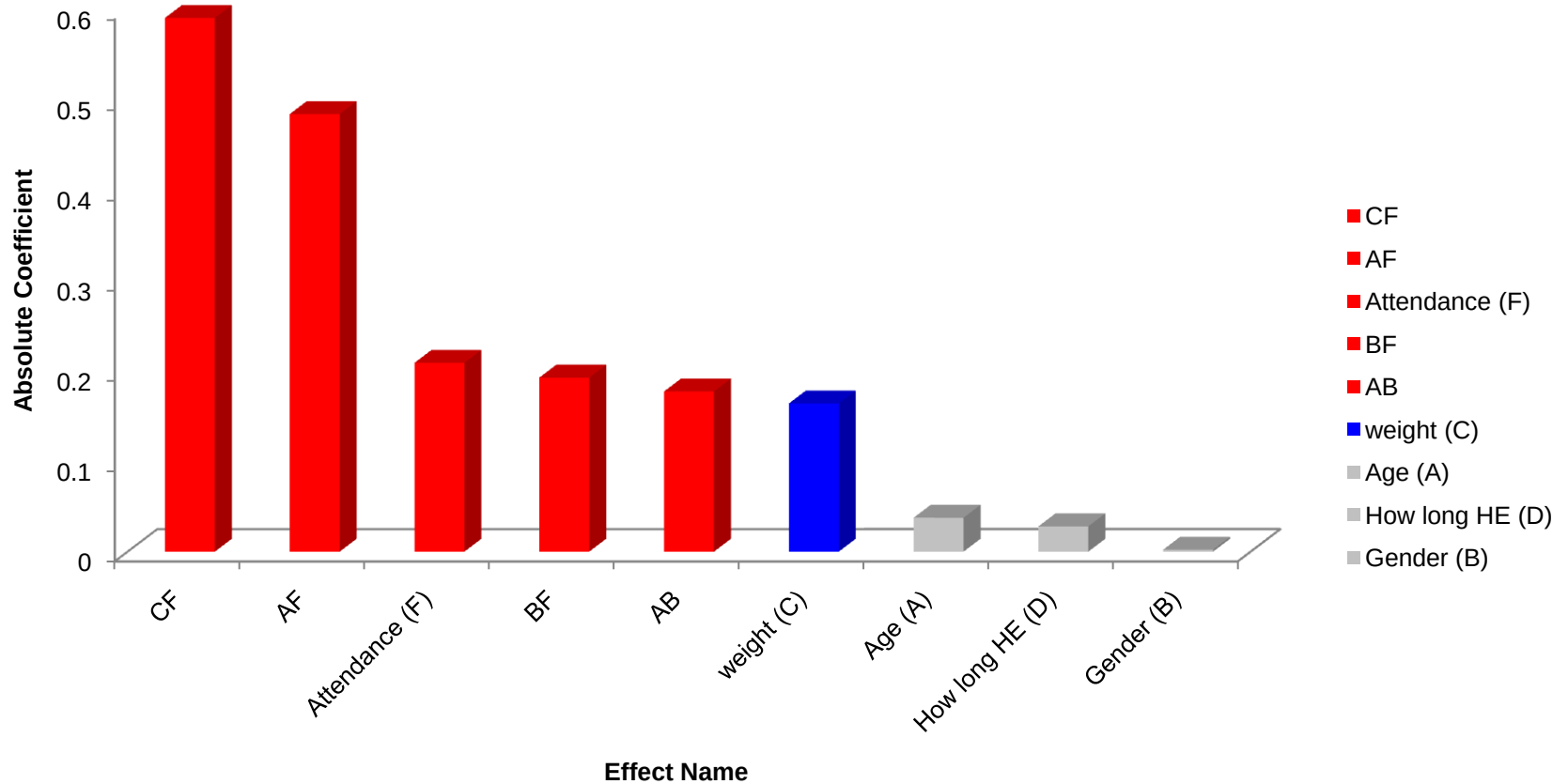
Within the framework of DOE there is a technique that looks at the historical data that has not been collected in a DOE structure and tries to find patterns or correlation

HOPE – IPO



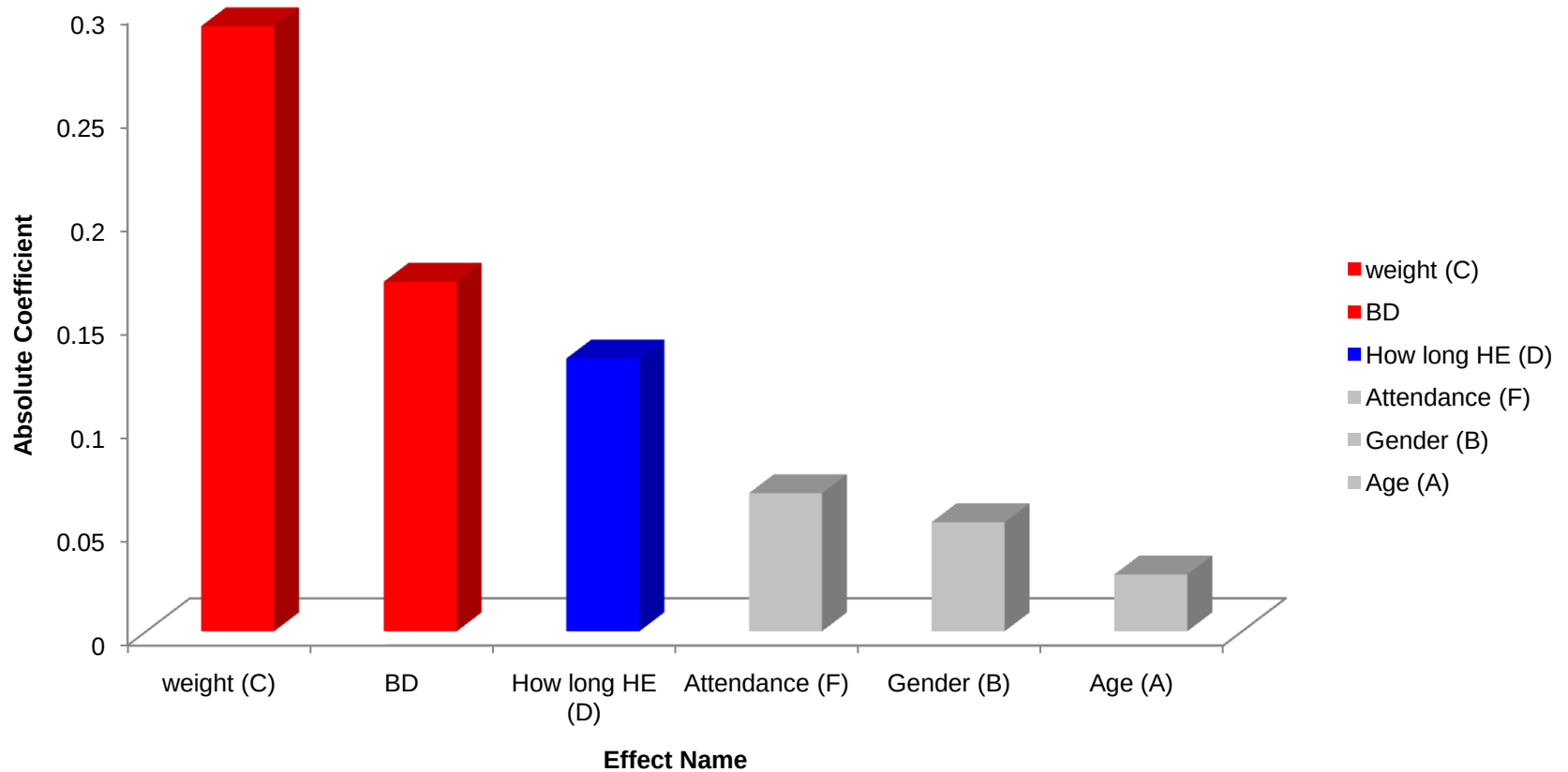
Health Awareness

Y-hat Pareto of Coeffs - Awareness



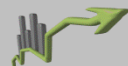
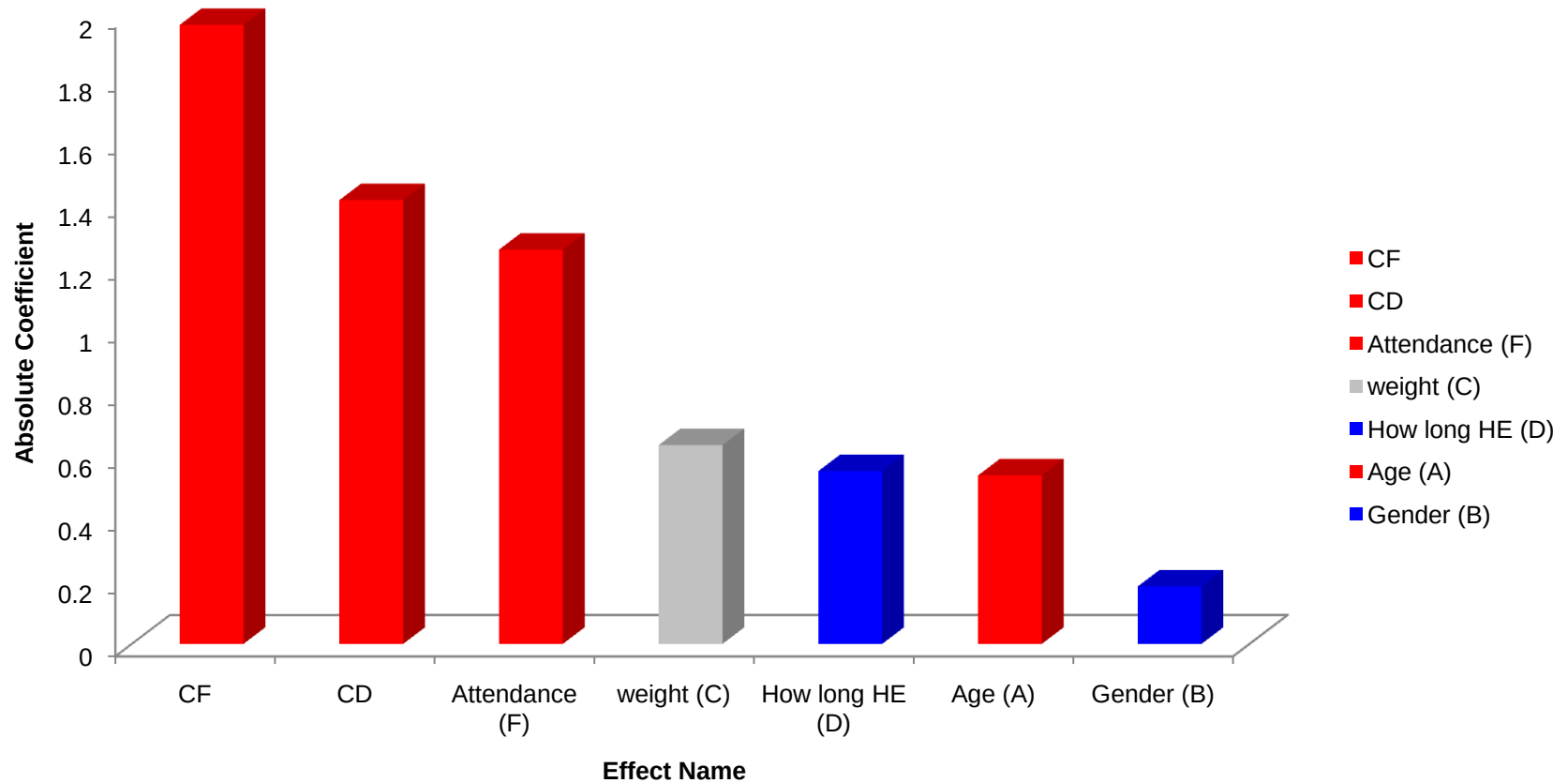
General Health Improvements

Y-hat Pareto of Coeffs - Health Improvement



Reduction in Prescription Medicine

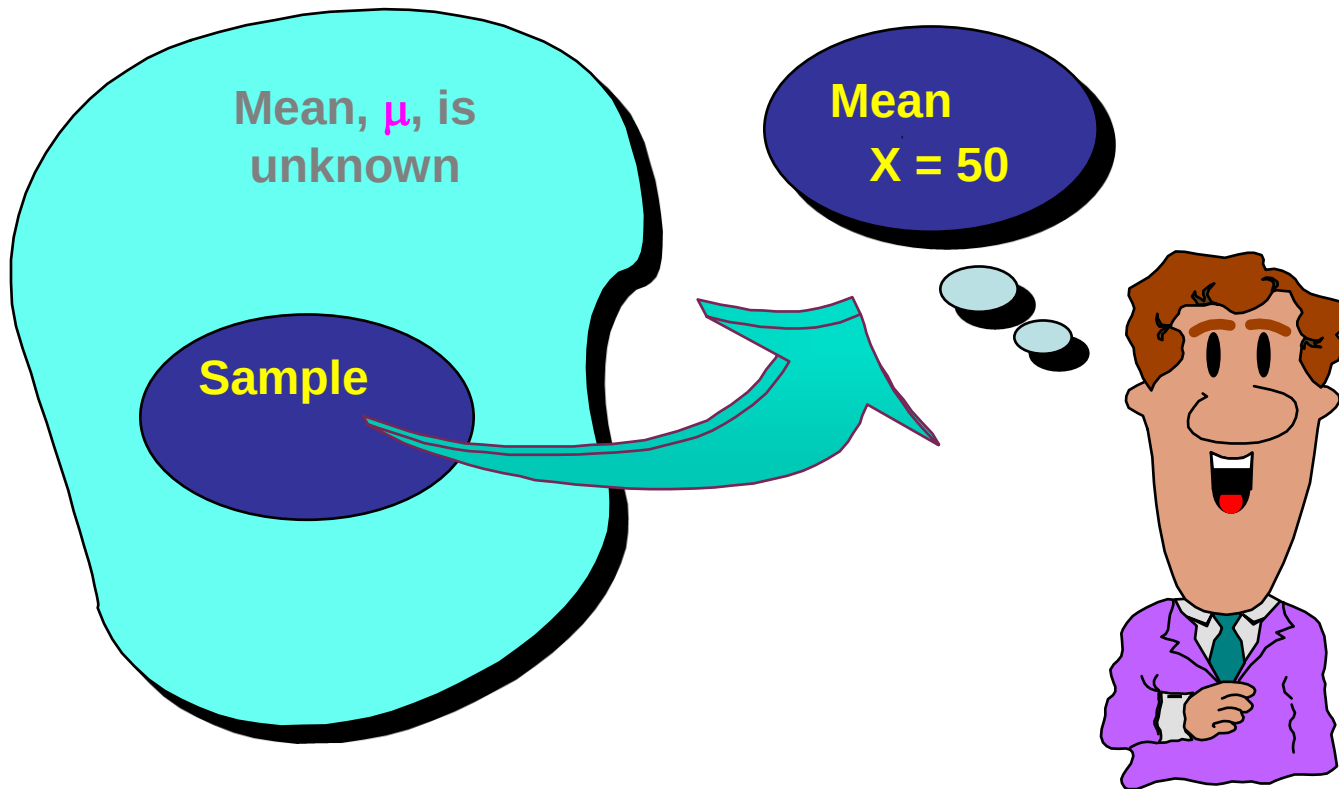
Y-hat Pareto of Coeffs - Medicine Reduction



Estimation Process

Population

Random Sample



I am 99% confident that μ is between 40 & 60.

Confidence Level for Health Awareness

Binomial Confidence Interval (Proportion) For Health Awareness		
User defined parameters		
Sample Size (n)		143
Number Defective(x)		132
Confidence Level		99.00%
Confidence Interval		
Lower Limit	$< p <$	Upper Limit
0.86567898	0.923076923	0.980474866

We are 99% Confident that the number of participants who will be more health aware among any 143 participants will be between 124 to 140

Experience Health Improvement

Binomial Confidence Interval (Proportion)		
General Health Improvement		
User defined parameters		
Sample Size (n)		143
Number Defective(x)		119
Confidence Level		99.00%
Confidence Interval		
Lower Limit	$< p <$	Upper Limit
0.751668528	0.832167832	0.912667136

We are 99% Confident that the number of participants who will experience health improvement among any 143 participants will be between 108 to 131

Reduction in Prescription Medicine

Binomial Confidence Interval (Proportion)		
User defined parameters		
Sample Size (n)		121
Number Defective(x)		30
Confidence Level		99.00%
Confidence Interval		
Lower Limit	$< p <$	Upper Limit
0.146817776	0.247933884	0.349049993

We are 99% Confident that the number of participants among any 121 participants who are taking medicine 18 to 42 participants will experience reduction in prescription medicine

Summary

Attendance at the HOPE programs has a positive impact on the awareness and general health of the participants

We are 99% Confident that as a consequence of participation in the HOPE programs at least:

- 86% participants will be more health aware
- 75% participants will experience general health improvement
- 15% will actually experience reduction in prescription medicine intake

Six Sigma provides a very powerful set of tools to improve the healthcare sector and validate the claims that are being made for improvements.