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Ask the Actuary:
Confidence Level Estimates

Confidence level estimates provide a way of calculating risk margins for reserving and pricing. In addition, they are a valuable tool in managing insurance programs since they quantify the financial effects of potential adverse experience under possible program choices such as limits, retentions, lines of coverage, capitalization, and investment strategy.

Q: What are confidence level estimates and confidence level risk margins?

A "confidence level" estimate of losses is the amount for which there is projected to be a certain likelihood that the actual losses will be less than or equal to that amount. For example, the average seasonal snowfall in New York City is 28 inches and the 75% confidence level estimate is 37 inches (based on data since 1869). This means that there is projected to be a 25% chance that the actual snowfall in a given season will be **more** than 37 inches (it looks like that will be the case this time!). A confidence level risk margin is the percentage difference between a confidence level estimate and the expected level estimate (the average). Therefore, the 75% confidence level risk margin for seasonal snowfall in New York City is 32% [(37÷28)-1].

Risk margins at any given confidence level are affected by:

- Loss portfolio size
- Inherent volatility of the line of coverage
- Retention levels

The financial strength and objectives of the insurer/self-insurer should also be considered when selecting the confidence level.

Q: What is a reasonable confidence level risk margin?

The risk margin at any given confidence level is generally higher for smaller loss portfolios, lines of coverage that are more inherently volatile, and higher retention levels. Management's selection of the confidence level should also consider the financial strength and objectives of the insurer/self-insurer. Below are examples of medical professional liability and workers' compensation confidence level risk margins based on data from a sample of CASCO clients.

Example: Medical Professional Liability

	Program with 25 Claims per Year		Program with 100 Claims per Year	
Per Claim Retention	75% Confidence Level Risk Margin	90% Confidence Level Risk Margin	75% Confidence Level Risk Margin	90% Confidence Level Risk Margin
$500,000	27%	57%	14%	28%
$5,000,000	40%	95%	22%	46%

Example: Workers' Compensation

Program Size	75% Confidence Level Risk Margin	90% Confidence Level Risk Margin
Annual payroll below $200,000,000	23%	63%
Annual payroll above $200,000,000	16%	36%