**Premium Determination Strategy**

To determine appropriate premiums for each risk group at SafeRoads, we aimed to set prices that would cover anticipated claims with a confidence level of 99.5%, ensuring financial stability with less than a 0.5% risk of falling short.

**Steps Taken**

1. **Risk Grouping and Data Analysis**: We began by categorizing policyholders into risk groups based on key factors like age and claim history. This allowed us to assess the risk level for each group individually.
2. **Modeling Claim Frequency and Severity**: For each group, we modeled claim frequency using a Poisson distribution and claim severity using a Gamma distribution, based on historical data. These estimates allowed us to simulate total losses, providing an expected loss and standard deviation for each group.
3. **Setting Premiums with a Confidence Threshold**: Using the expected loss and standard deviation, we calculated premiums to cover potential claims with a 99.5% confidence level. This ensures a strong buffer for unexpected high claims.
4. **Implementing a Meaningful Minimum Premium**: To avoid premiums that are too low, we set a minimum premium as 10% above the average expected loss across all groups. This buffered minimum ensures even low-risk groups have sufficient premiums for coverage.

**Results of Premium Determination**

The premiums calculated for each risk group reflect the unique characteristics and risk levels within each category:

* **Senior**: With the highest premium at $1371.04, this group showed a higher expected loss, which aligns with their elevated claim severity. This premium provides a strong buffer for their higher risk of claims.
* **Young**: The premium for this group was set at $108.69, which is higher than most other groups due to their relatively high claim frequency. This premium helps to manage the increased likelihood of claims.
* **Young Adult, Adult, and Elder**: These groups received premiums close to the minimum threshold of $6.33, indicating that their risk levels were relatively low. The buffered minimum ensures that even these low-risk groups have sufficient coverage.