

Key Insights from the Analysis

1. Age vs Charges:

- Medical charges increase significantly with age, especially after 40.
- Insight: Older customers are more likely to incur higher healthcare costs.

2. BMI vs Charges:

- Higher BMI is associated with higher charges, especially in the obese category (>30 BMI).
- Insight: Obese individuals are high-risk from an insurer's perspective and may require wellness programs.

3. Smokers vs Non-Smokers:

- Smokers are charged significantly more than non-smokers.
- Insight: Smoking is one of the most influential factors on insurance costs. Strong case for preventive campaigns and premium differentiation.

4. Gender Distribution:

- Charges are almost similar across genders, with no significant bias.
- Insight: Gender does not substantially affect medical costs alone.

5. Children vs Charges:

- Number of children doesn't directly affect the charges.
- Insight: Adding dependents may not immediately increase cost unless health issues are present.

6. Regional Analysis:

- No major difference in average charges across regions.
- Insight: Geography doesn't play a strong role in cost variation, though it may impact access to care.

7. Smoker + High BMI + Older Age = Maximum Charges:

- The combination of smoking, high BMI, and age leads to extremely high charges.
 - Insight: These are the highest-risk profiles and should be a focus for personalized risk management.
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Suggested Next Steps (for the Health Insurance Company)

1. Risk-Based Premium Adjustment:

- Use insights (age, smoking, BMI) to create dynamic pricing models for premiums.

2. Preventive Health Programs:

- Launch initiatives to reduce smoking and obesity—both of which are major cost drivers.

3. Customer Segmentation:

- Group policyholders by risk profile (e.g., Young Non-Smokers, Elderly Smokers, etc.) to tailor plans and communication.

4. Predictive Modelling:

- Build a model to predict expected medical charges based on customer features.
- Can also flag potential fraud or outlier claims.

5. Health Risk Scorecard:

- Assign a health risk score to each customer to guide underwriting and renewal decisions.

6. Customized Policy Bundles:

- Offer wellness incentives, gym memberships, or non-smoker discounts based on lifestyle attributes.