Customer Churn Analysis Summary

1. Dataset Overview

- **Total Customers**: 7,043
- **Features**: 21 columns including customer demographics, service usage, contract details, and churn status.
- **Churn Rate**: 26.54% of customers have churned (1,869 out of 7,043).

2. Key Characteristics & Churn Impact

A. Gender Distribution

- **Male**: 50.47% (3,555 customers)
- **Female**: 49.53% (3,488 customers)
- **Churn by Gender**:
    - **Male**: 26.11% churn rate.
    - **Female**: 26.94% churn rate.
- **Insight**: Gender has minimal impact on churn.

Graph: Churn by Gender

python

```
plt.figure(figsize=(6, 4))
sns.countplot(x="gender", data=df, hue="Churn")
plt.title("Churn by Gender")
plt.show()
```

B. Senior Citizens

- **Senior Citizens (Yes)**: 16.21% (1,141 customers).
- **Non-Seniors (No)**: 83.79% (5,902 customers).
- **Churn Rate**:
    - **Seniors**: 41.42% churn rate.
    - **Non-Seniors**: 23.62% churn rate.
- **Insight**: Seniors are significantly more likely to churn.

Graph: Churn by Senior Citizen Status

python

```
plt.figure(figsize=(6, 4))
sns.countplot(x="SeniorCitizen", data=df, hue="Churn")
```

```
plt.title("Churn by Senior Citizen Status")

plt.show()
```

C. Contract Type

- **Month-to-Month**: 55.02% (3,875 customers).
- **One Year**: 24.15% (1,701 customers).
- **Two Year**: 20.83% (1,467 customers).
- **Churn Rate**:
    - **Month-to-Month**: 42.76% churn rate.
    - **One Year**: 11.27% churn rate.
    - **Two Year**: 2.84% churn rate.
- **Insight**: Short-term contracts have the highest churn.

Graph: Churn by Contract Type

python

```
plt.figure(figsize=(8, 5))

sns.countplot(x="Contract", data=df, hue="Churn", order=["Month-to-month", "One year", "Two year"])

plt.title("Churn by Contract Type")

plt.show()
```

D. Internet Service

- **Fiber Optic**: 43.96% (3,097 customers).
- **DSL**: 34.13% (2,404 customers).
- **No Internet**: 21.91% (1,542 customers).
- **Churn Rate**:
    - **Fiber Optic**: 41.89% churn rate.
    - **DSL**: 19.24% churn rate.
    - **No Internet**: 7.45% churn rate.
- **Insight**: Fiber optic users churn more, possibly due to higher expectations or competition.

Graph: Churn by Internet Service

python

```
plt.figure(figsize=(8, 5))

sns.countplot(x="InternetService", data=df, hue="Churn")
```

```
plt.title("Churn by Internet Service")
plt.show()
```

E. Payment Method

- **Electronic Check**: 33.58% (2,365 customers).
- **Mailed Check**: 22.90% (1,613 customers).
- **Bank Transfer**: 21.60% (1,521 customers).
- **Credit Card**: 21.92% (1,544 customers).
- **Churn Rate**:
    - **Electronic Check**: 45.33% churn rate.
    - **Mailed Check**: 19.16% churn rate.
    - **Bank Transfer**: 16.37% churn rate.
    - **Credit Card**: 16.71% churn rate.
- **Insight**: Electronic checks are associated with the highest churn.

Graph: Churn by Payment Method

```
python
plt.figure(figsize=(10, 6))
sns.countplot(x="PaymentMethod", data=df, hue="Churn")
plt.title("Churn by Payment Method")
plt.xticks(rotation=45)
plt.show()
```

3. Key Takeaways

1. **High-Risk Groups**:
    - **Seniors**: 41.42% churn rate (vs. 23.62% for non-seniors).
    - **Month-to-Month Contracts**: 42.76% churn rate (vs. 2.84% for two-year contracts).
    - **Fiber Optic Users**: 41.89% churn rate (vs. 19.24% for DSL).
    - **Electronic Check Payers**: 45.33% churn rate (vs. ~16% for other methods).
2. **Actionable Insights**:
    - Target retention efforts on seniors and month-to-month customers.
    - Investigate fiber optic service quality or pricing.
    - Promote automated payment methods (bank transfer/credit card) over electronic checks.

4. Recommendations

- **Retention Strategies**:
    - Offer discounts or perks for long-term contracts.
    - Improve fiber optic service reliability or customer support.
    - Provide incentives for seniors (e.g., tailored plans).
- **Data Collection**:
    - Add customer satisfaction surveys to identify pain points.
    - Track reasons for churn (e.g., price, service quality).

Appendix: Additional Visualizations

Overall Churn Distribution

python

```
plt.figure(figsize=(6, 6))
df["Churn"].value_counts().plot.pie(autopct="%1.1f%%", labels=["No", "Yes"])
plt.title("Overall Churn Rate (26.54%)")
plt.show()
```

Tenure vs. Churn

python

```
plt.figure(figsize=(10, 6))
sns.boxplot(x="Churn", y="tenure", data=df)
plt.title("Tenure Distribution by Churn Status")
plt.show()
```

Insight: Churned customers have significantly lower tenure (median ~10 months vs. ~38 months for retained customers).