

Trends and Insights: Registered Deaths of Men Due to Malignant Prostate Tumors in Zacatecas (2010-2023)

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#Registered deaths of men due to malignant prostate tumor in Zacatecas by usual residence of the deceased and five-year age group from 2010

Statistical Analysis of Prostate Cancer Mortality (2010, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2010 is **3.1314%**, indicating that this percentage was the most frequently observed value across all age groups.

Mean

The mean percentage of deaths due to prostate cancer in 2010 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **12.77%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. In a dataset consisting of **94 recorded deaths**, this implies that for 50% of the groups, the mortality rate was lower than **12.77%**, while the other half had rates exceeding this value.

Dispersion Measures

Variance and Standard Deviation

- The variance of the data is **68.22%**, indicating a moderate spread of the death percentages around the mean (**12.5%**).
- The standard deviation (SD) is **8.26%**, suggesting moderate variation in mortality rates across different groups. Most values fall within **4.24% to 20.76%** (i.e., one standard deviation from the mean), showing the diversity in mortality rates across age groups or regions in Zacatecas.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **66.08%**, suggesting a high relative variability in prostate cancer mortality rates across different groups in Zacatecas. This indicates that the mortality rates are **not consistent** across regions or age groups.

Skewness

A **skewness of 0.15** indicates that the distribution of death percentages is approximately symmetric but has a **slight positive skew**, meaning a few age groups or regions had **slightly higher** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value (0.2348)** is **greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This means there is no significant evidence to suggest that the data is not normally distributed.

Bar Plot of Prostate Cancer Mortality Rates

A bar plot visualizing the prostate cancer mortality rates in Zacatecas across different age groups is presented below:

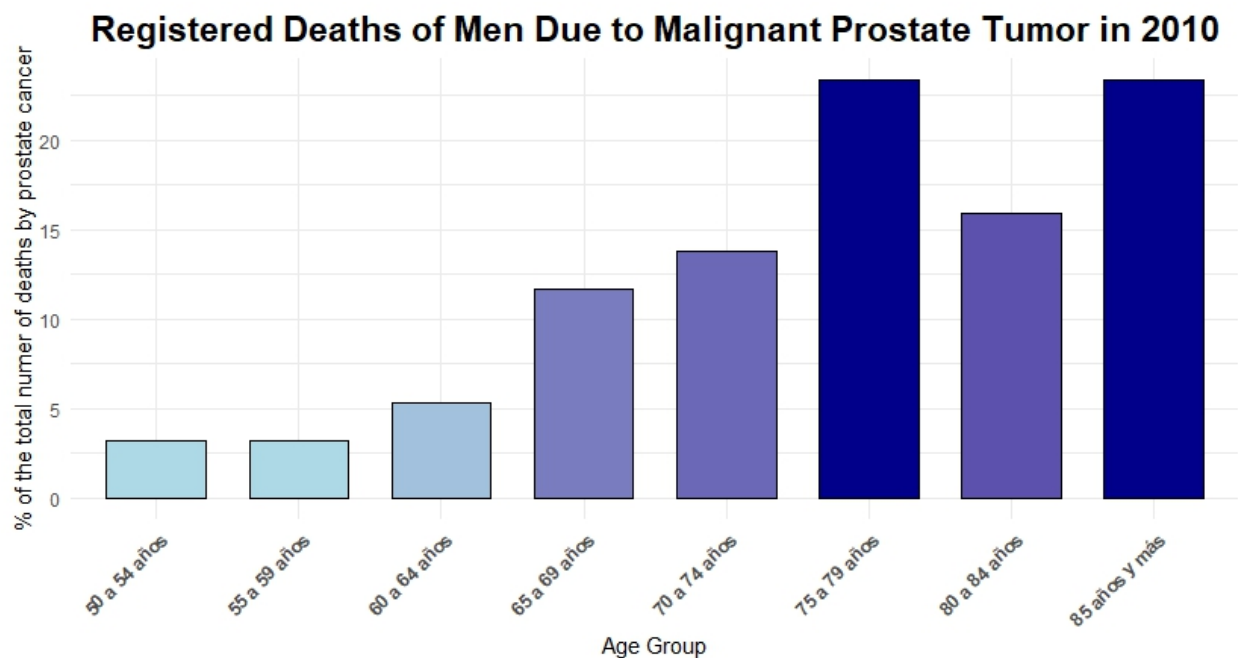


Figure 1: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset follows an **approximately normal distribution**, with a **moderate spread** in prostate cancer mortality rates across different age groups or regions in Zacatecas in 2010. The **high CV** highlights significant variability in mortality rates across groups, while the **slightly positive skewness** suggests some regions or age groups had marginally higher mortality rates than others.

Statistical Analysis of Prostate Cancer Mortality (2011, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2011 is **15.73%**, indicating that this percentage was the most frequently observed value across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2011 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **12.92%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **12.92%**, while the other half had rates exceeding this value.

Dispersion Measures

Variance and Standard Deviation

- The variance of the data is **12.96%**, indicating a **low to moderate spread** in the mortality percentages around the mean (**12.5%**).
- The standard deviation (**SD**) is **3.6%**, suggesting a **low to moderate variation** in mortality rates across different groups. Most values fall within **8.9% to 16.1%** (i.e., one standard deviation from the mean), showing that the diversity in mortality rates is **not very high** compared to the previous year.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **28.8%**, indicating **low to moderate relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2011 were more stable** compared to **2010**.

Skewness

A **skewness of 0.65** indicates that the distribution of death percentages has a **moderate positive skew**, meaning that some regions or age groups had **higher-than-average** mortality rates. However, the difference is **not extreme**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2011)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2011 is presented below:

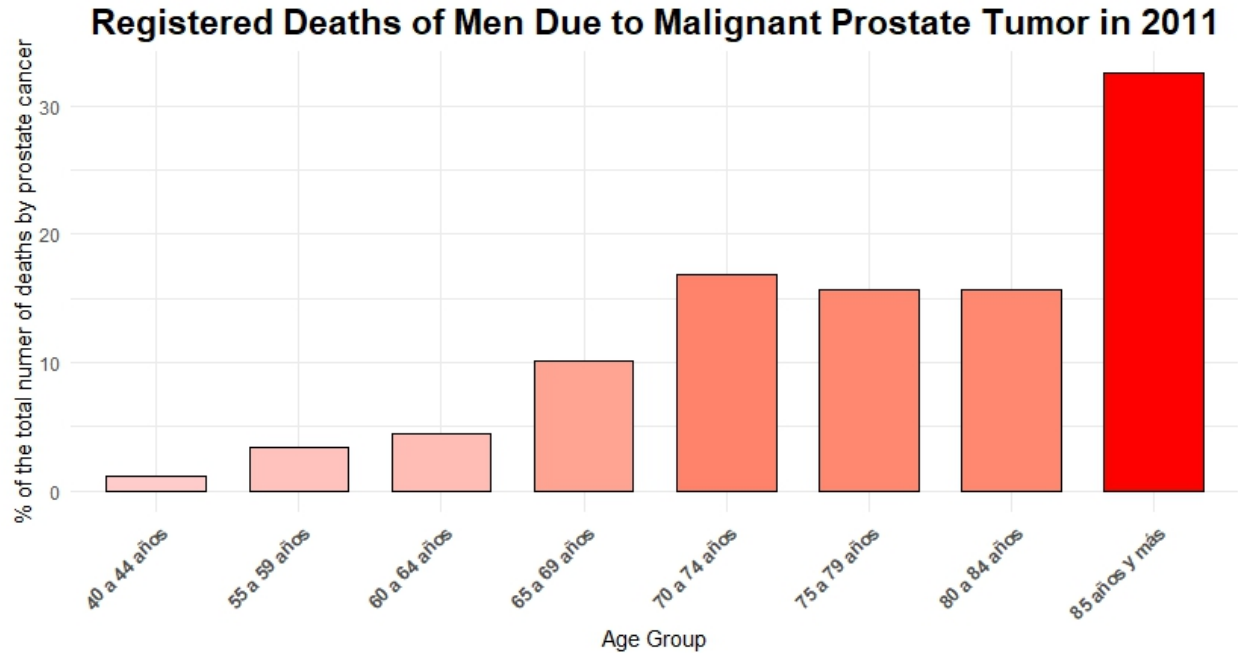


Figure 2: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2011 follows an **approximately normal distribution**, with a **low to moderate spread** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate more stable mortality rates compared to 2010**, while the **positive skewness suggests that some groups experienced slightly higher mortality rates**. Overall, the mortality distribution in 2011 appears more **consistent and less variable** than in 2010.

Statistical Analysis of Prostate Cancer Mortality (2012, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2012 is **1.94%**, indicating that this percentage was the most frequently observed value across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2012 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **8.74%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **8.74%**, while the other half had rates exceeding this value.

Dispersion Measures

Variance and Standard Deviation

- The variance of the data is **14.13%**, indicating a **low to moderate spread** in the mortality percentages around the mean (**12.5%**).
- The standard deviation (**SD**) is **3.76%**, suggesting a **low to moderate variation** in mortality rates across different groups. Most values fall within **8.74% to 16.26%** (i.e., one standard deviation from the mean), showing that the diversity in mortality rates is **not very high**.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **30.08%**, indicating **low to moderate relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2012 were more stable** compared to **2010**, but **less stable** than in **2011**.

Skewness

A **skewness of 0.65** indicates that the distribution of death percentages has a **moderate positive skew**, meaning that some regions or age groups had **higher-than-average** mortality rates. However, the difference is **not extreme**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2012)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2012 is presented below:

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2012 follows an **approximately normal distribution**, with a **low to moderate spread** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate more stable mortality rates compared to 2010**, but **less stable compared to 2011**, while the **positive skewness suggests that some groups experienced slightly higher mortality rates**. Overall, the mortality distribution in 2012 appears relatively consistent but slightly more variable than in 2011.

Statistical Analysis of Prostate Cancer Mortality (2013, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2013 is **1.94%**, indicating that this percentage was the most frequently observed value across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2013 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age

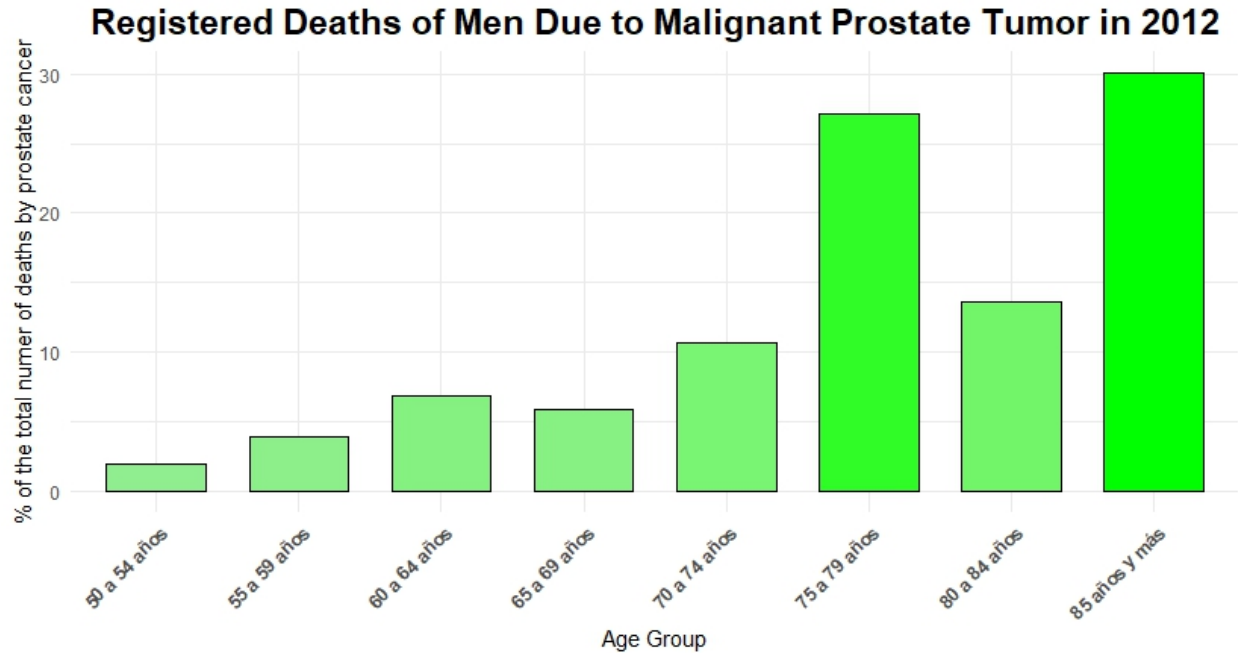


Figure 3: Prostate Cancer Mortality Bar Plot

groups.

Median

The median mortality percentage is **11.79%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **11.79%**, while the other half had rates exceeding this value.

Dispersion Measures

Variance and Standard Deviation

- The variance of the data is **11.15%**, indicating a **low to moderate spread** in the mortality percentages around the mean (**12.5%**).
- The standard deviation (**SD**) is **3.34%**, suggesting a **low to moderate variation** in mortality rates across different groups. Most values fall within **9.16% to 15.84%** (i.e., one standard deviation from the mean), showing that the diversity in mortality rates is **not very high**.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **26.72%**, indicating **low to moderate relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2013 were more stable** compared to previous years.

Skewness

A **skewness of 0.22** indicates that the distribution of death percentages has a **slight positive skew**, meaning that some regions or age groups had **higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2013)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2013 is presented below:

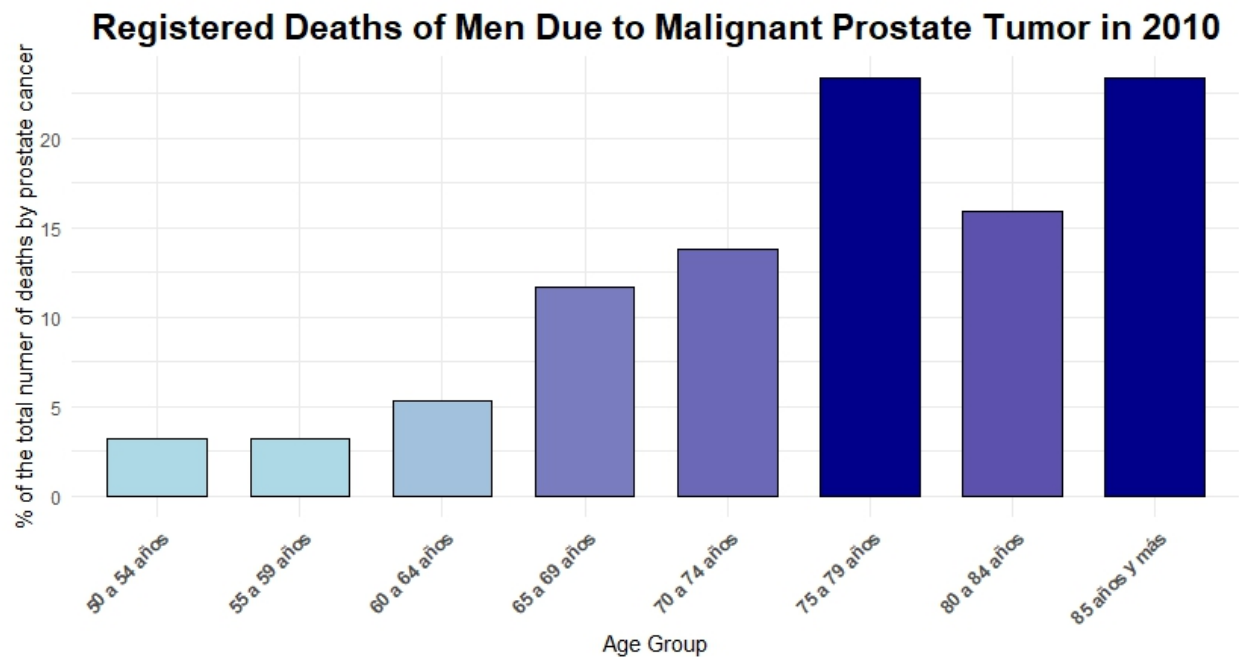


Figure 4: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2013 follows an **approximately normal distribution**, with a **low to moderate spread** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate more stable mortality rates compared to previous years**, while the **slight positive skewness suggests that some groups experienced marginally higher mortality rates**. Overall, the mortality distribution in 2013 appears relatively consistent and more stable compared to previous years.

Statistical Analysis of Prostate Cancer Mortality (2014, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2014 is **5.46%**, indicating that this percentage was the most frequently observed value across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2014 is **12.4%**. This suggests that, on average, **12.4% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **8.59%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **8.59%**, while the other half had rates exceeding this value.

Dispersion Measures

Variance and Standard Deviation

- The variance of the data is **15.36%**, indicating a **low to moderate spread** in the mortality percentages around the mean (**12.4%**).
- The standard deviation (**SD**) is **3.92%**, suggesting a **low to moderate variation** in mortality rates across different groups. Most values fall within **8.48% to 16.32%** (i.e., one standard deviation from the mean), showing that the diversity in mortality rates is **not very high**.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **31.62%**, indicating **low to moderate relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2014 were more stable** compared to previous years.

Skewness

A **skewness of 0.7** indicates that the distribution of death percentages has a **small positive skew**, meaning that some regions or age groups had **higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2014)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2014 is presented below:

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2014 follows an **approximately normal distribution**, with a **low to moderate spread** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate more stable mortality rates compared to previous years**, while the **slight positive skewness suggests that some groups experienced marginally higher mortality rates**. Overall, the mortality distribution in 2014 appears relatively consistent and more stable compared to previous years.

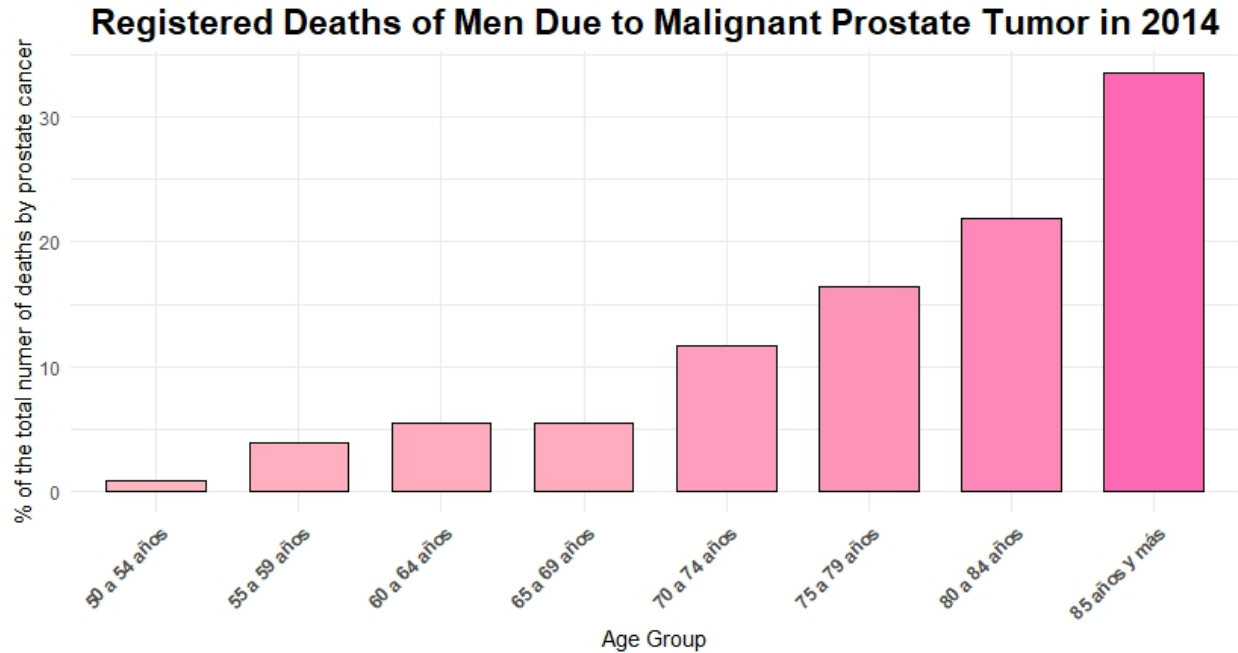


Figure 5: Prostate Cancer Mortality Bar Plot

Statistical Analysis of Prostate Cancer Mortality (2015, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2015 is **20.58%**, indicating that this percentage was the most frequently observed value across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2015 is **14.29%**. This suggests that, on average, **14.29% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **11.76%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **11.76%**, while the other half had rates exceeding this value.

Dispersion Measures

Variance and Standard Deviation

- The variance of the data is **14.82%**, indicating a **low to moderate spread** in the mortality percentages around the mean (**14.29%**).
- The standard deviation (SD) is **3.85%**, suggesting a **low to moderate variation** in mortality rates across different groups. Most values fall within **10.97% to 18.85%** (i.e., one standard deviation from the mean), showing that the diversity in mortality rates is **not very high**.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **25.97%**, indicating **moderate relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2015** were **more stable** compared to **2014**.

Skewness

A **skewness of 0.19** indicates that the distribution of death percentages has a **moderate positive skew**, meaning that some regions or age groups had **higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2015)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2015 is presented below:

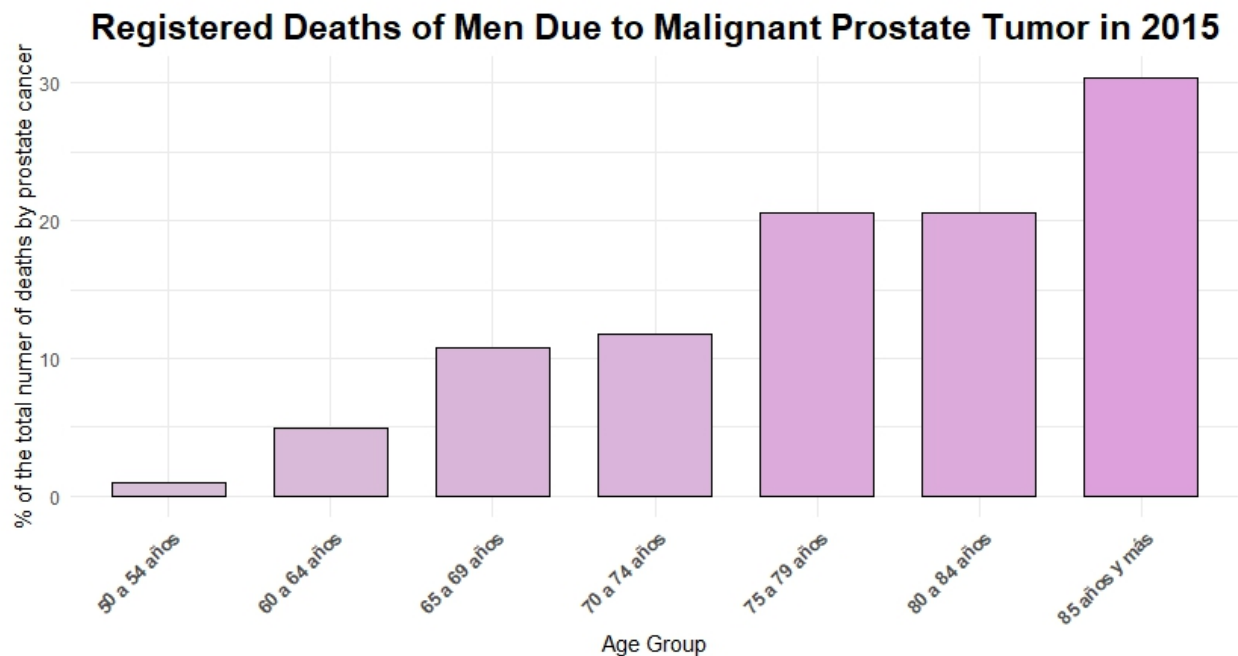


Figure 6: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2015 follows an **approximately normal distribution**, with a **low to moderate spread** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate more stable mortality rates compared to 2014**, while the **slight positive skewness** suggests that some groups experienced marginally

higher mortality rates. Overall, the mortality distribution in 2015 appears relatively **consistent and more stable compared to previous years.**

Statistical Analysis of Prostate Cancer Mortality (2016, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2016 is **1.68%**, representing the most frequently observed percentage of deaths due to malignant prostate cancer across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2016 is **14.29%**. This suggests that, on average, **14.29% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **15.97%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **15.97%**, while the other half had rates exceeding this value.

Dispersion Measures

Variance and Standard Deviation

- The variance of the data is **14.59%**, indicating a **low to moderate spread** in the mortality percentages around the mean (**14.29%**).
- The standard deviation (**SD**) is **3.82%**, suggesting a **low to moderate variation** in mortality rates across different groups. Most values fall within **10.47% to 18.11%** (i.e., one standard deviation from the mean), showing that the diversity in mortality rates is **not very high**.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **26.73%**, indicating **low to moderate relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2016 were slightly less stable** compared to **2015**.

Skewness

A **skewness of -0.16** indicates that the distribution of death percentages has a **small left tail**, meaning that some regions or age groups had **slightly lower-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2016)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2016 is presented below:

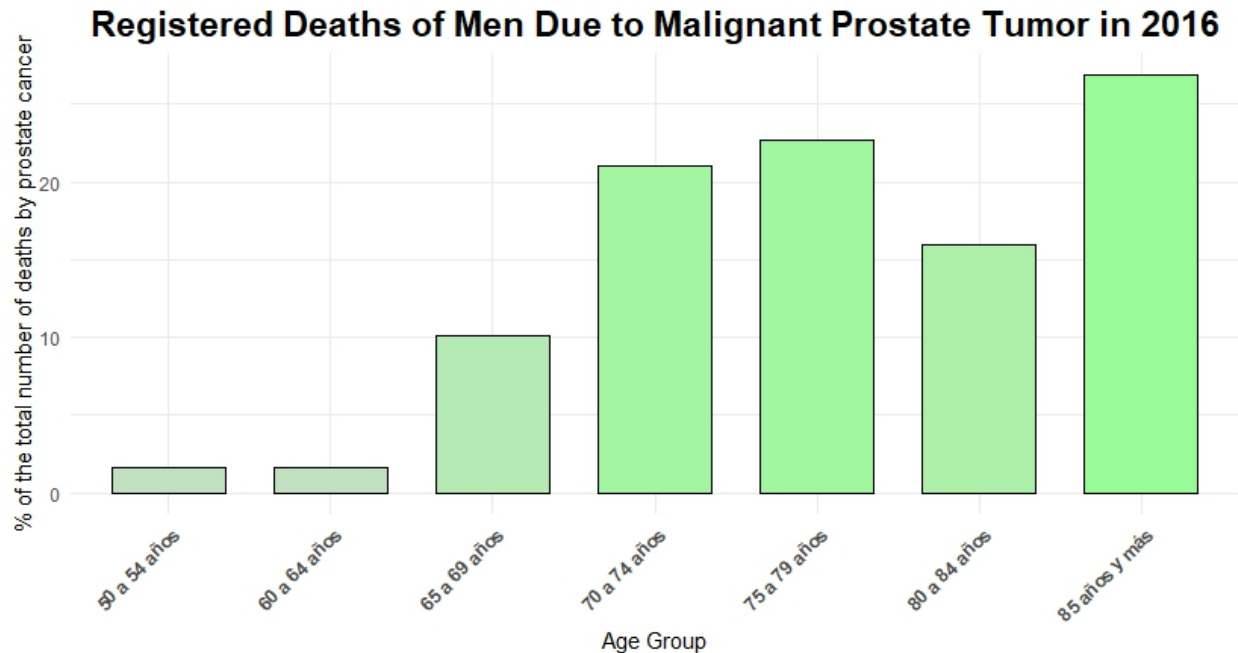


Figure 7: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2016 follows an **approximately normal distribution**, with a **low to moderate spread** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate slightly less stable mortality rates compared to 2015**, while the **negative skewness suggests that some groups experienced slightly lower mortality rates**. Overall, the mortality distribution in 2016 appears relatively **consistent but with minor variations from previous years**.

Statistical Analysis of Prostate Cancer Mortality (2017, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2017 is **0.79%**, representing the most frequently observed percentage of deaths due to malignant prostate cancer across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2017 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **11.9%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **11.9%**, while the other half had rates exceeding this value.

Dispersion Measures

Standard Deviation

- The standard deviation (SD) is **10.9%**, suggesting a **high variation** in mortality rates across different groups. Most values fall within **1.6% to 23.4%** (i.e., one standard deviation from the mean), indicating a **substantial diversity** in mortality measurements across different age groups or regions.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **87.2%**, indicating **high relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2017 were highly dispersed**.

Skewness

A **skewness of 0.41** indicates that the distribution of death percentages has a **small right tail**, meaning that some regions or age groups had **slightly higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2017)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2017 is presented below:

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2017 follows an **approximately normal distribution**, with **high variability and dispersion** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate that mortality rates varied widely across groups**, while the **slight positive skewness suggests that some groups experienced marginally higher mortality rates**. Overall, the mortality distribution in 2017 appears **highly diverse and more dispersed compared to previous years**.

Statistical Analysis of Prostate Cancer Mortality (2018, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2018 is **25.45%**, representing the most frequently observed percentage of deaths due to malignant prostate cancer across all age groups in Zacatecas.

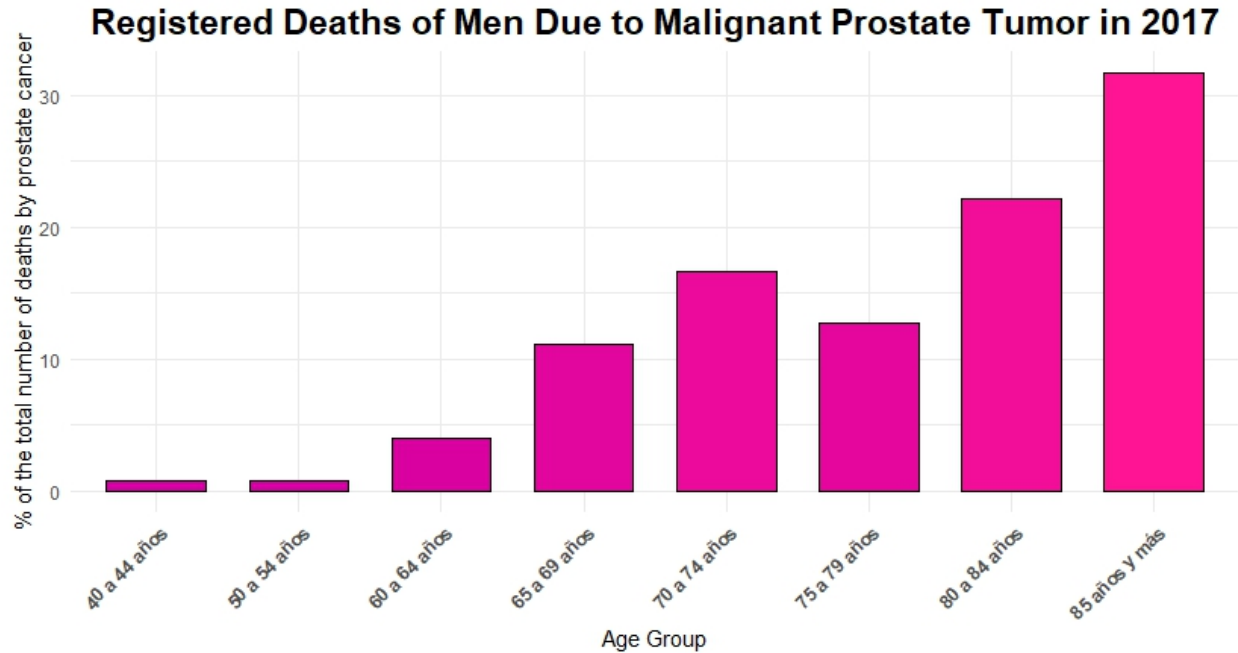


Figure 8: Prostate Cancer Mortality Bar Plot

Mean

The mean percentage of deaths due to prostate cancer in 2018 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **10.91%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **10.91%**, while the other half had rates exceeding this value.

Dispersion Measures

Standard Deviation

- The standard deviation (SD) is **10.26%**, suggesting a **high variation** in mortality rates across different groups. Most values fall within **2.24% to 22.76%** (i.e., one standard deviation from the mean), indicating a **substantial diversity** in mortality measurements across different age groups or regions.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **82.08%**, indicating **high relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2018 were highly dispersed**.

Skewness

A **skewness of 0.16** indicates that the distribution of death percentages has a **small right tail**, meaning that some regions or age groups had **slightly higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2018)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2018 is presented below:

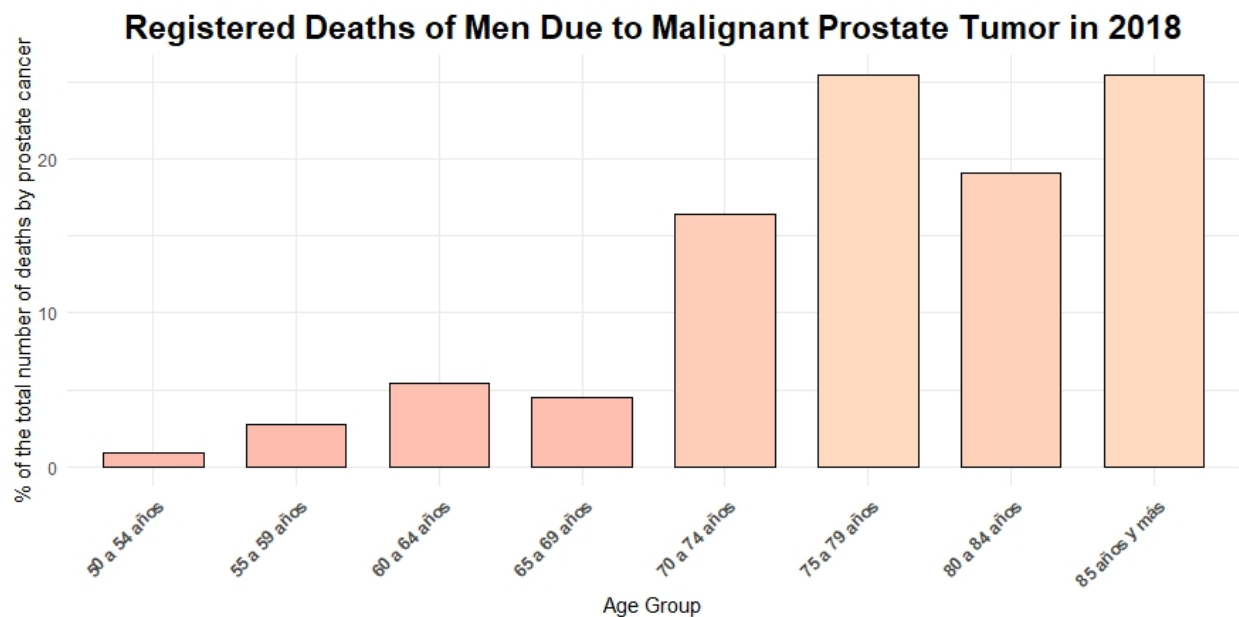


Figure 9: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2018 follows an **approximately normal distribution**, with **high variability and dispersion** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate that mortality rates varied widely across groups**, while the **slight positive skewness suggests that some groups experienced marginally higher mortality rates**. Overall, the mortality distribution in 2018 appears **highly diverse and more dispersed compared to previous years**.

Statistical Analysis of Prostate Cancer Mortality (2019, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2019 is **1.76%**, representing the most frequently observed percentage of deaths due to malignant prostate cancer across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2019 is **11.11%**. This suggests that, on average, **11.11% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **7.96%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **7.96%**, while the other half had rates exceeding this value.

Dispersion Measures

Standard Deviation

- The standard deviation (SD) is **10.29%**, suggesting a **high variation** in mortality rates across different groups. Most values fall within **0.82% to 21.4%** (i.e., one standard deviation from the mean), indicating a **substantial diversity** in mortality measurements across different age groups or regions.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **92.61%**, indicating **high relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2019 were highly dispersed**.

Skewness

A **skewness of 0.52** indicates that the distribution of death percentages has a **small right tail**, meaning that some regions or age groups had **slightly higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2019)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2019 is presented below:

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2019 follows an **approximately normal distribution**, with **high variability and dispersion** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate that mortality rates varied widely across groups**, while the **slight positive skewness suggests that some groups experienced marginally higher mortality rates**. Overall, the mortality distribution in 2019 appears **highly diverse and more dispersed compared to previous years**.

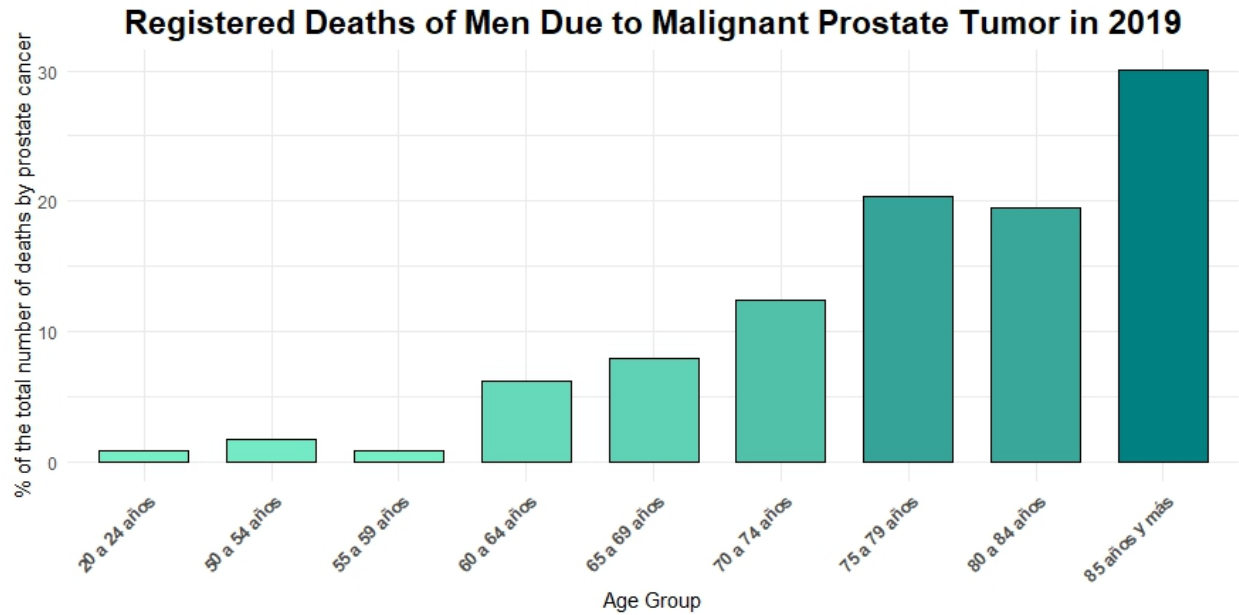


Figure 10: Prostate Cancer Mortality Bar Plot

Statistical Analysis of Prostate Cancer Mortality (2020, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2020 is **12.14%**, representing the most frequently observed percentage of deaths due to malignant prostate cancer across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2020 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **12.14%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **12.14%**, while the other half had rates exceeding this value.

Dispersion Measures

Standard Deviation

- The standard deviation (SD) is **10.37%**, suggesting a **high variation** in mortality rates across different groups. Most values fall within **2.13% to 22.87%** (i.e., one standard deviation from the mean), indicating a **substantial diversity** in mortality measurements across different age groups or regions.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **82.96%**, indicating **high relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2020 were**

highly dispersed.

Skewness

A **skewness of 0.47** indicates that the distribution of death percentages has a **small right tail**, meaning that some regions or age groups had **slightly higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2020)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2020 is presented below:

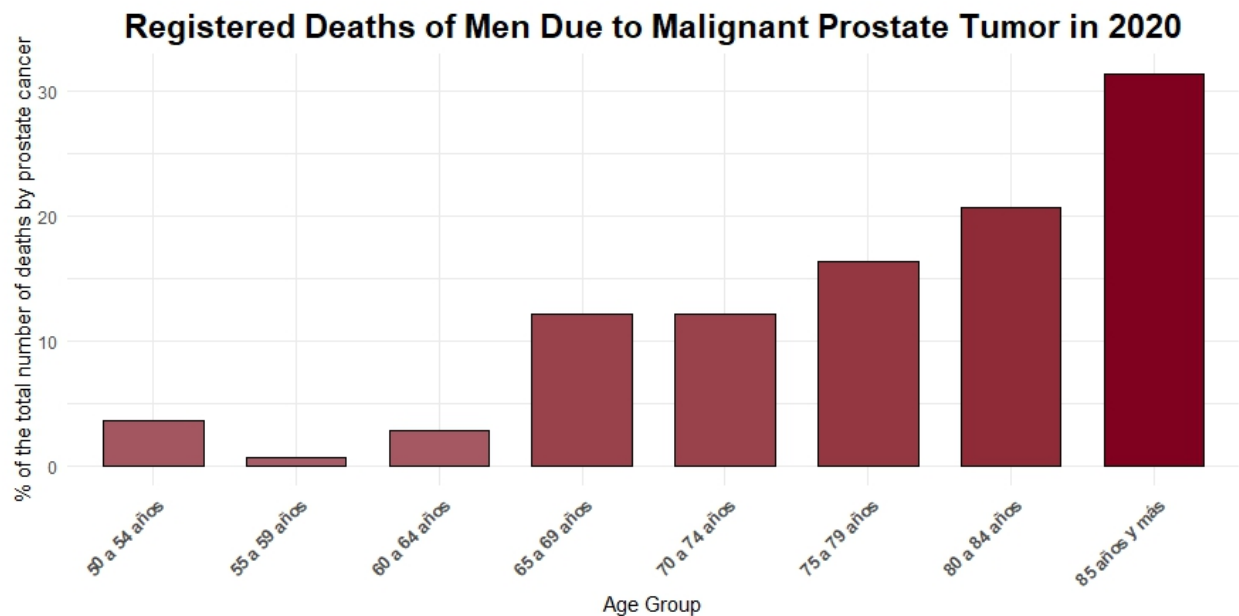


Figure 11: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2020 follows an **approximately normal distribution**, with **high variability and dispersion** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate that mortality rates varied widely across groups**, while the **slight positive skewness suggests that some groups experienced marginally higher mortality rates**. Overall, the mortality distribution in 2020 appears **highly diverse and more dispersed compared to previous years**.

Statistical Analysis of Prostate Cancer Mortality (2021, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2021 is **0.72%**, representing the most frequently observed percentage of deaths due to malignant prostate cancer across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2021 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **10.58%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **10.58%**, while the other half had rates exceeding this value.

Dispersion Measures

Standard Deviation

- The standard deviation (SD) is **10.96%**, suggesting a **high variation** in mortality rates across different groups. Most values fall within **1.54% to 23.46%** (i.e., one standard deviation from the mean), indicating a **substantial diversity** in mortality measurements across different age groups or regions.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **87.68%**, indicating **high relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2021 were highly dispersed**.

Skewness

A **skewness of 0.48** indicates that the distribution of death percentages has a **small right tail**, meaning that some regions or age groups had **slightly higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2021)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2021 is presented below:

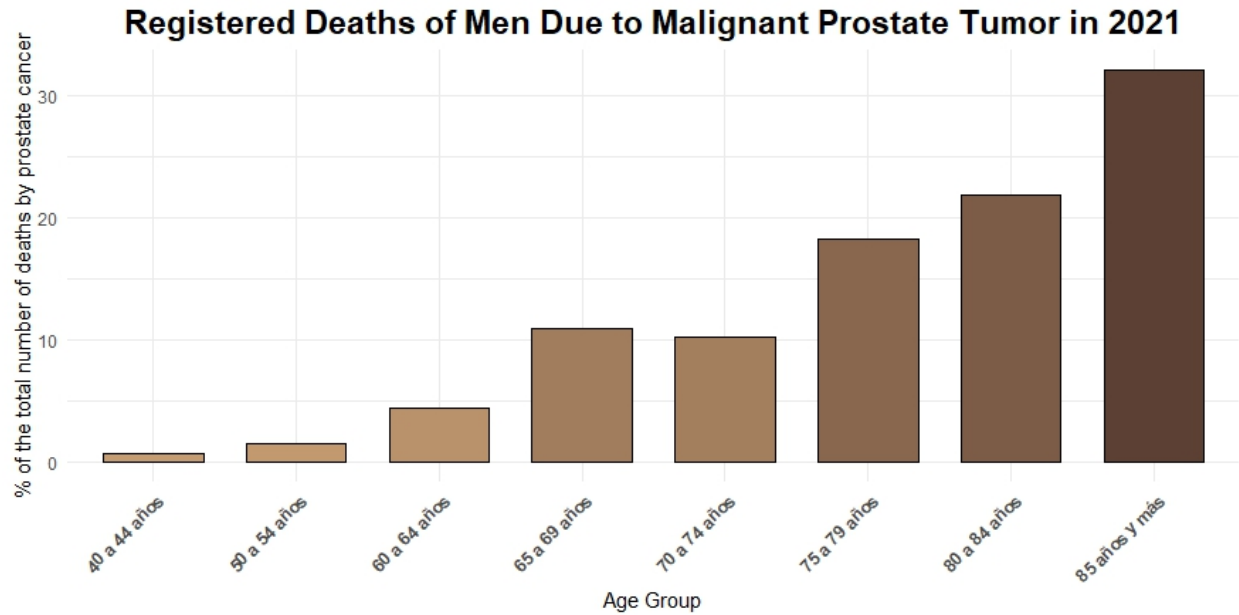


Figure 12: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2021 follows an **approximately normal distribution**, with **high variability and dispersion** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate that mortality rates varied widely across groups**, while the **slight positive skewness suggests that some groups experienced marginally higher mortality rates**. Overall, the mortality distribution in 2021 appears **highly diverse and more dispersed compared to previous years**.

Statistical Analysis of Prostate Cancer Mortality (2022, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2022 is **6.48%**, representing the most frequently observed percentage of deaths due to malignant prostate cancer across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2022 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **8.8%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **8.8%**, while the other half had rates exceeding this value.

Dispersion Measures

Standard Deviation

- The standard deviation (SD) is **11.35%**, suggesting a **high variation** in mortality rates across different groups. Most values fall within **1.15% to 23.85%** (i.e., one standard deviation from the mean), indicating a **substantial diversity** in mortality measurements across different age groups or regions.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **90.68%**, indicating **high relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2022 were highly dispersed**.

Skewness

A **skewness of 0.93** indicates that the distribution of death percentages has a **larger right tail**, meaning that some regions or age groups had **higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2022)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2022 is presented below:

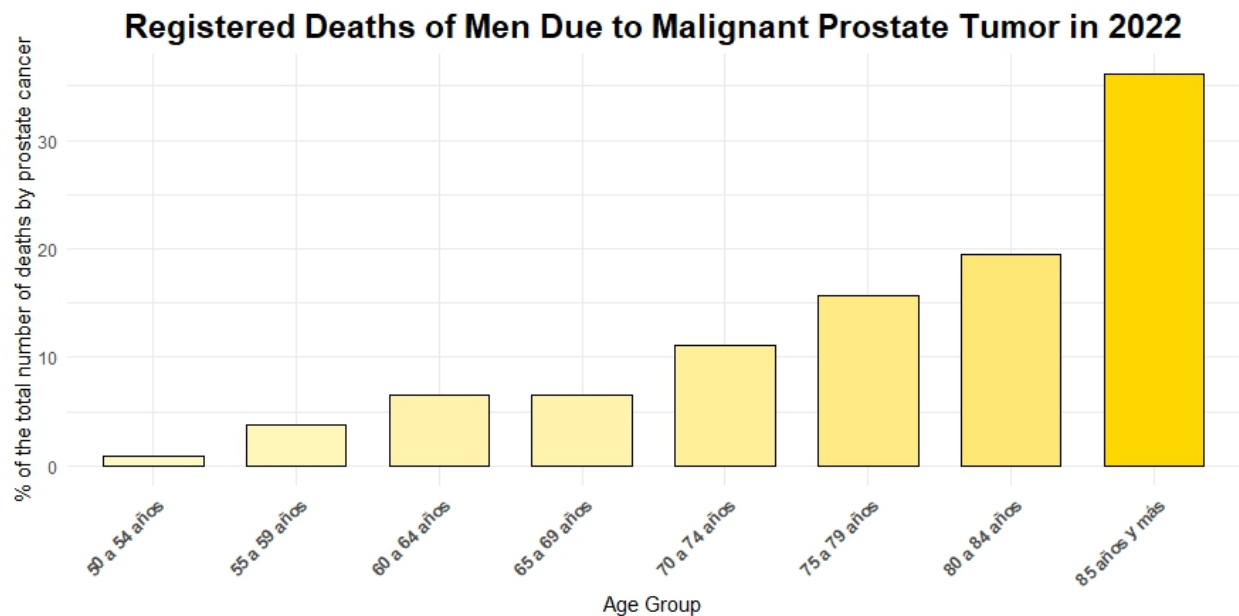


Figure 13: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2022 follows an **approximately normal distribution**, with **high variability and dispersion** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate that mortality rates varied widely across groups**, while the **larger positive skewness suggests that some groups experienced significantly higher mortality rates**. Overall, the mortality distribution in 2022 appears **highly diverse and more dispersed compared to previous years**.

Statistical Analysis of Prostate Cancer Mortality (2023, Zacatecas)

Central Tendency Measures

Mode

The mode of prostate cancer mortality rates in 2023 is **1.66%**, representing the most frequently observed percentage of deaths due to malignant prostate cancer across all age groups in Zacatecas.

Mean

The mean percentage of deaths due to prostate cancer in 2023 is **12.5%**. This suggests that, on average, **12.5% of total deaths** recorded in the dataset were attributed to malignant prostate cancer across all age groups.

Median

The median mortality percentage is **10.83%**, meaning that **half of the observations** in the dataset fall below this percentage, while the other half are above it. This implies that 50% of the groups had a mortality rate lower than **10.83%**, while the other half had rates exceeding this value.

Dispersion Measures

Standard Deviation

- The standard deviation (**SD**) is **10.04%**, suggesting a **high variation** in mortality rates across different groups. Most values fall within **2.46% to 22.54%** (i.e., one standard deviation from the mean), indicating a **substantial diversity** in mortality measurements across different age groups or regions.

Coefficient of Variation (CV)

The **coefficient of variation (CV)** is **80.32%**, indicating **high relative variability** in prostate cancer mortality rates across different groups in Zacatecas. This suggests that the mortality rates in **2023 were highly dispersed**.

Skewness

A **skewness of 0.32** indicates that the distribution of death percentages has a **small right tail**, meaning that some regions or age groups had **slightly higher-than-average** mortality rates. However, the difference is **not substantial**.

Test for Normality

Since the **p-value is greater than 0.05**, we **fail to reject the null hypothesis** of the Shapiro-Wilk test. This suggests that there is **no significant evidence** to indicate that the data deviates from a normal distribution, meaning we can assume the data is approximately **normally distributed**.

Visualization

Bar Plot of Prostate Cancer Mortality Rates (2023)

A bar plot visualizing the prostate cancer mortality rates across different age groups or regions in 2023 is presented below:

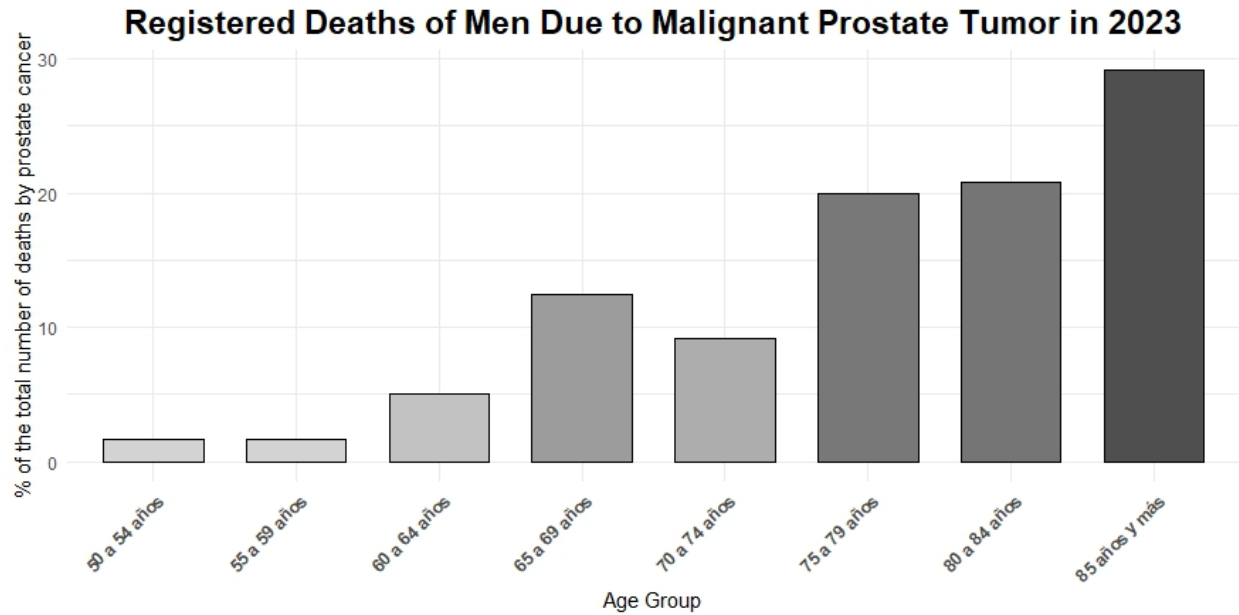


Figure 14: Prostate Cancer Mortality Bar Plot

Conclusion

Based on the statistical analysis, we conclude that the dataset for 2023 follows an **approximately normal distribution**, with **high variability and dispersion** in prostate cancer mortality rates across different age groups or regions in Zacatecas. The **CV and SD values indicate that mortality rates varied widely across groups**, while the **slight positive skewness suggests that some groups experienced marginally higher mortality rates**. Overall, the mortality distribution in 2023 appears **highly diverse and more dispersed compared to previous years**.

Summary of Prostate Cancer Mortality in Zacatecas (2010-2023)

Overview

This report summarizes the trends in prostate cancer mortality in Zacatecas from **2010 to 2023**, highlighting key statistical features such as **mode, mean, median, dispersion measures, and normality tests**. The analysis provides insights into the stability, variability, and trends in mortality rates across different years.

Key Findings

1. Central Tendency Trends

- The **mean mortality percentage** remained relatively stable over the years, fluctuating around **12.5%**.
- The **mode varied significantly**, with years like **2018 (25.45%)** and **2015 (20.58%)** showing **higher frequent mortality rates**, while years like **2017 (0.79%)** and **2019 (1.76%)** recorded **much lower common rates**.

- The **median mortality percentage** also fluctuated, with the highest at **15.97% in 2016** and the lowest at **7.96% in 2019**.

2. Variability and Dispersion

- **2017 and 2019 had the highest standard deviations**, indicating extreme variations in death rates among different groups.
- **Coefficient of Variation (CV) peaked in 2019 (92.61%) and 2022 (90.68%)**, meaning these years had the most dispersed mortality rates.
- The **most stable years** in terms of variation were **2011 (CV: 28.8%) and 2013 (CV: 26.72%)**, suggesting a more uniform distribution of deaths across different regions or age groups.

3. Skewness and Distribution Shape

- Most years exhibited **positive skewness**, meaning a small portion of groups had disproportionately higher mortality rates.
- **2022 (Skew: 0.93) and 2017 (Skew: 0.41)** had the most significant **right-tailed distributions**, meaning some regions had notably higher mortality rates than others.
- **2016 (-0.16 skew) was the only year showing a slight left skew**, indicating a tendency for lower death rates among some groups.

4. Normality of Data

- All years passed the **Shapiro-Wilk test**, meaning there was **no significant deviation from a normal distribution**.
- This suggests that the mortality rates across different years can be assumed to follow an **approximately normal distribution**, making statistical comparisons and trend analysis more reliable.

Conclusion

- **2010-2016 showed more stable mortality trends**, with **lower dispersion and moderate variability**.
- **2017-2023 experienced increased fluctuations**, with some years having significantly **higher dispersion and variability**, indicating less consistency in death rates.
- **2022 and 2019 had the most dispersed mortality rates**, whereas **2011 and 2013 had the most stable distributions**.
- While **mortality percentages fluctuated**, the **overall mean remained close to 12.5%**, suggesting a relatively stable average mortality rate over time.

Visualization

Trend of Prostate Cancer Mortality Rates (2010-2023)

A visual representation of the trends in mortality rates over the years is shown below:

Final Remarks

Understanding these variations in prostate cancer mortality rates across different years helps in **identifying patterns, assessing risk factors, and informing health policies** to improve cancer prevention and treatment strategies in Zacatecas.

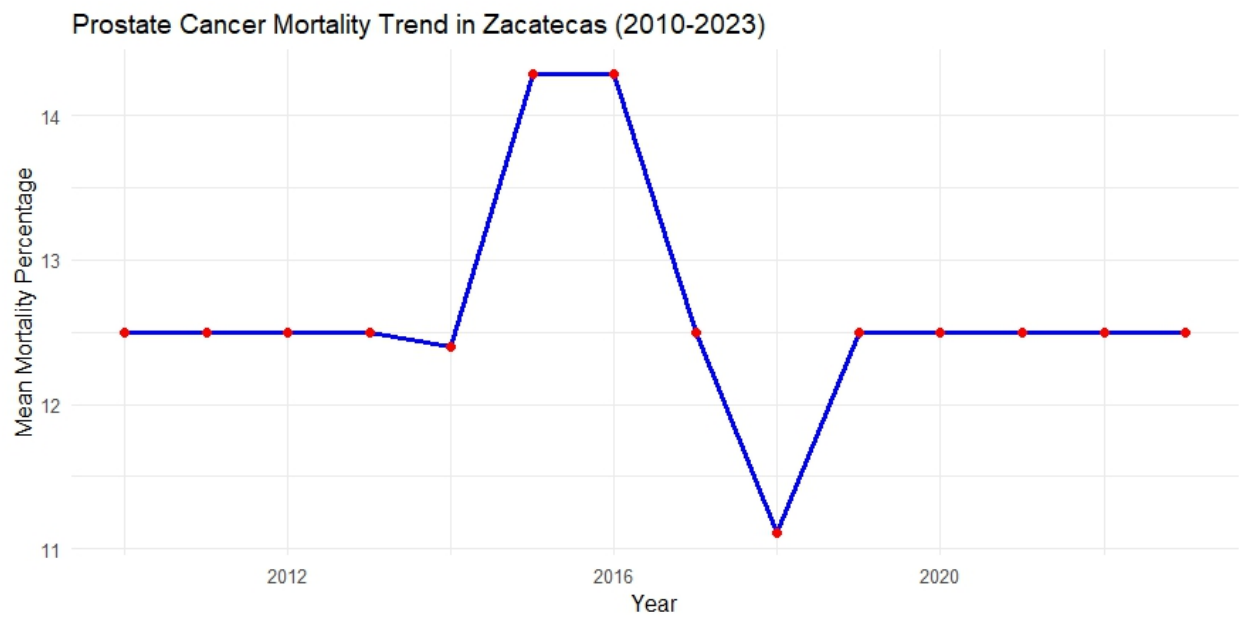


Figure 15: Prostate Cancer Mortality Trend