# Response to Pupil-Teacher Ratio Analysis Question

## (a) Estimating the Median P-T Ratio

To estimate the median P-T ratio for each group, I would:

1. Identify the total number of states in each group (West = 24, East = 26)

2. Find the position of the median (12.5th value for West, 13.5th value for East)

3. Count frequencies cumulatively from the histograms until I reach the median position

4. Interpolate if necessary within the interval containing the median

\*\*For the West group:\*\*

- Total states = 24, so median position is at 12.5

- Cumulative frequencies: 0 (through 10), 0 (through 12), 4 (through 14), 10 (through 16), 14 (through 18), 17 (through 20), etc.

- The 12.5th value falls between values 14 and 16

- Since the 12.5th position falls in the upper part of this interval, I estimate the median P-T ratio for West ≈ 15.5

\*\*For the East group:\*\*

- Total states = 26, so median position is at 13.5

- Cumulative frequencies: 0 (through 10), 4 (through 14), 15 (through 16), 19 (through 18), etc.

- The 13.5th value falls within the 14-16 range

- Since 13.5 falls close to the beginning of this interval, I estimate the median P-T ratio for East ≈ 15.0

## (b) Comparing the Distributions

The distributions of P-T ratios for the two groups show notable differences. The West group demonstrates a relatively symmetric distribution centered around 15-16, with a moderate spread from approximately 12 to 22. In contrast, the East group displays a more concentrated distribution with a pronounced peak at the 14-16 interval, where approximately 11 states (42% of eastern states) fall. The East group also shows less variability, with most values clustered between 12 and 18. The West group has a slightly higher central tendency and exhibits greater dispersion, suggesting more variability in pupil-teacher ratios across western states compared to eastern states.

## (c) Comparing Mean P-T Ratios

I would expect the mean P-T ratio to be slightly higher for the West group than the East group for the following reasons:

1. The West distribution appears to have a slight positive skew with values extending further into the higher ranges (20-24), which would pull the mean upward relative to the median.

2. The East distribution is more concentrated around its center with fewer high values, suggesting less influence from extreme values.

3. Based on the median estimates (West ≈ 15.5, East ≈ 15.0) and the visible shapes of the distributions, the mean for the West group would likely exceed that of the East group by approximately 0.5-1.0 units.

In summary, the mean P-T ratio for western states would likely be higher than for eastern states during the 2001-2002 school year, reflecting the generally higher pupil-teacher ratios and greater variability observed in the western states.