

STA 130: Practice Questions using Provincial Data

The following table gives, for each of Canada's ten provinces, data about their 2010 average total income¹ in dollars, and 2007–9 life expectancy² in years, and 2010 estimated percentage of adults who smoke³.

Province	Income	LifeExpect	SmokePerc
BC	40196	80	17.4
AL	53408	79	22.7
SK	40933	77	22.8
MB	36795	77	18.8
ON	42643	79	19.3
PQ	36491	79	23.3
NB	34164	78	22.5
PEI	33632	78	23.6
NS	36108	78	23.2
NL	35345	79	23.0

1. For the average total income, compute (a) the sample mean, (b) the sample variance, (c) the sample standard deviation, and (d) a 95% confidence interval.
2. Repeat the previous question for the life expectancy.
3. Repeat the previous question for the smoking percentage.
4. Conduct a statistical test of the null hypothesis that the true mean average total income is \$52,000, versus the alternative hypothesis that it is less. State your conclusion in a clear complete English sentence.
5. Conduct a statistical test of the null hypothesis that the true mean smoking percentage is 20%, versus the alternative hypothesis that it is different from 20%. State your conclusion in a clear complete English sentence.

¹https://en.wikipedia.org/wiki/List_of_Canadian_provinces_and_territories_by_gross_domestic_product#Per_capita_GDP

²<http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/health26-eng.htm>

³<http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/health74b-eng.htm>

6. Conduct a statistical test of the null hypothesis that the five most western provinces (BC, AL, SK, MB, and ON) have the same true mean average total income as the five most eastern provinces (PQ, NB, PEI, NS, NL), versus the alternative hypothesis that the western provinces have higher true mean average total income. State your conclusion in a clear complete English sentence.

7. Compute a 95% confidence interval for the difference of the true mean average total income of the five most western provinces, minus the true mean average total income of the five most eastern provinces. State your conclusion in a clear complete English sentence.

8. For total income and life expectancy, (a) compute the sample correlation; (b) compute a 95% confidence interval for the true correlation, and state your conclusion in a clear complete English sentence; and (c) compute a P-value to test the null hypothesis that the true correlation is zero (i.e., they are uncorrelated), versus that alternative hypothesis that the true correlation is not zero, and state your conclusion in a clear complete English sentence.

9. Repeat the previous question for total income and smoking percentage.

10. Repeat the previous question for life expectancy and smoking percentage.