PBIO 504

**Meta-Analysis Homework**

In this assignment you will find two tables of data regarding associations of stomach cancer risk with green or black tea consumption. For several decades, epidemiologists have been studying whether drinking tea protects against a wide range of different cancers. By this time there are enough published results for a meaningful meta-analysis. Some of the results were from case-control studies of stomach cancer, and others were prospective studies of cancer incidence among tea drinkers and non-drinkers (or those who rarely drink tea). From each study, the tables below record the relative risk (odds ratios were assumed to be good estimators of RR) with their 95% CI, contrasting the highest and lowest levels of tea consumption reported in that population: for example, three or more cups per day versus none.

Use the data in these tables, including the summary RR that we calculated for you, to draw a forest plot according to the instructions below.

You can draw a Forest Plot by hand on graph paper, or use Excel.

Follow the instructions below carefully, and answer all the questions.

Questions about green tea

1. Attach your forest plot of all green tea studies (see Table 1, below).

2. Describe your overall impressions of the plot: what does it reveal?

3. Interpret the summary statistic (what does it mean?).

4. Compare and contrast the results from the prospective group of studies with the case-control studies (with or without a forest plot). Would you derive a different conclusion from either type of study alone, compared to the plot in Question 1? You might have to speculate about those summary RRs, not provided by study type.

5. Similarly, compare and contrast the group of studies from Asia with those from other countries.

Questions about black tea

6. Attach your forest plot of all black tea studies (see Table 2, below).

7. Describe your overall impressions of the plot: what does it reveal?

8. Interpret the summary statistic (what does it mean?).

Overall conclusions

9. The information presented in the tables did not take into account the weight of each study. If you knew it, how might that information have changed your impressions of the patterns you saw in the graphs?

10. Meta analysis can be a useful tool to summarize the medical literature on a specific association. Besides the information you have seen in these tables and graphs, what else would you want to know before recommending that everyone drink tea to prevent cancer?

Table 1. Risk estimates from studies of green tea consumption (comparing highest level to none/lowest) and stomach cancer risk

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Study type | Author, year | RR (95% CI) |
| China | Case-control | Tewes 1990 | 2.74 (1.10 - 6.81) |
| Japan | Case-control | Ohno 1995 | 0.52 (0.30-0.90) |
| China | Prospective cohort | Xu 1996 | 0.50 (0.41- 0.61) |
| Japan | Prospective cohort | Nakachi 2000 | 0.33 (0.11 - 0.96) |
| USA | Case-control | LeMarchand 2000 | 0.90 (0.50-1.61) |
| Japan | Prospective cohort | Nagano 2001 | 0.79 (0.58 - 1.08) |
| China | Case-control | Zhong 2001 | 0.51 (0.28 – 0.93) |
| Japan | Case-control | Takezaki 2001 | 1.11 (0.83 – 1.48) |
| Japan | Prospective cohort | Khan 2004 | 0.62 (0.34 – 1.14) |
| China | Case-control | Bonner 2005 | 0.59 (0.26 – 1.35) |
| Czech | Case-control | Kubik 2008 | 0.99 (0.81 – 1.20) |
| Canada | Prospective cohort | Li 2008 | 1.17 (0.85 – 1.61) |
|  |  | summary | 0.78 (0.61 - 0.96) |

Table 2. Risk estimates from studies of black tea consumption (comparing highest level to none/lowest) and stomach cancer risk

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Study type | Author, year | RR (95% CI) |
| USA | Case-control | Mettlin 1989 | 1.09 (0.62 – 1.92) |
| China | Case-control | Tewes 1990 | 1.43 (0.88 – 2.33) |
| Netherlands | Prospective cohort | Goldbohm 1996 | 1.07 (0.73- 1.57) |
| USA | Prospective cohort | Zheng 1996 | 1.05 (0.71 – 1.55) |
| Sweden | Case-control | Axelsson 1996 | 0.74 (0.33 - 1.65) |
| Sweden | Case-control | Nyberg 1998 | 1.27 (0.73 – 2.21) |
| Uruguay | Case-control | Mendia 1998 | 0.34 (0.14 – 0.83) |
| USA | Case-control | LeMarchand 2000 | 1.10 (0.69 - 1.76) |
| Finland | Prospective cohort | Hirvonen 2001 | 0.66 (0.54 – 0.81) |
| Canada | Case-control | Hu 2002 | 0.40 (0.21 – 0.75) |
| Japan | Prospective cohort | Khan 2004 | 0.97 (0.28 – 3.40) |
| USA | Case-control | Baker 2005 | 0.90 (0.66 – 1.23) |
| USA | Case-control | Cui 2008 | 0.42 (0.24 - 0.73) |
| Czech | Case-control | Kubic 2008 | 1.02 (0.75 – 1.39) |
|  |  | summary | 0.86 (0.70 – 1.15) |