

Example of how to develop the Discussion section

'Example' is from an outbreak investigation manuscript

Box 1: Example of a first paragraph of the Discussion

We identified three groups of factors that affected the risk of typhoid in Kurseong, Darjeeling. These results provide some understanding of the practices that expose the community to typhoid. The first factor was related to the supply, storage and use of drinking water, as well as sanitation *{will be discussed in the first middle paragraph}*, the second to the consumption of raw vegetables and unwashed fruits *{will be discussed in the second middle paragraph}*, and the third to consumption of milk products *{will be discussed in the third middle paragraph}*. These insights provide useful suggestions for behaviour change interventions to prevent typhoid.

Box 2: Example of the third middle paragraph of the Discussion

Eating butter or yoghurt increased the risk of developing typhoid fever in Darjeeling. This risk also increased with the quantity of product consumed. Milk and ice cream have transmitted typhoid in a number of typhoid outbreaks (references). *S. typhi* grows in dairy products if they become contaminated (reference). Contamination may occur through poor handing, for example absence of hand washing or indirect contamination with sewage that may contaminate containers, or from the adulteration of milk with dirty water. In our study, the association between consumption of milk products and typhoid was stronger among persons of lower socio-economic status. In Darjeeling district, two kinds of milk products are available. Poorer people – who in this study had elevated rates -- tend to purchase cheaper, local products that are not subject to quality assurance measures. Richer people tend to purchase more expensive commercially available products from commercial production. Thus, our findings support the hypothesis that typhoid in Darjeeling arose in part from local milk products contaminated with *S. typhi* through poor handing and/or adulteration.

Box 3: Limitations

This study had one main limitation. We had only one positive blood culture for *Salmonella* (*enterica*) Typhi. Thus, we cannot exclude the possibility that a number of the 103 suspected cases had other forms of infections and we may have overestimated the size of the outbreak. In the case control study, we included only probable cases that had a Widal test $\geq 1:80$. The use of a single Widal agglutination test for the diagnosis of typhoid is controversial, particularly when the reagents are not standard and when there are no data on the local sensitivity and specificity for a given dilution. However, in the context of India, (1) a 1:80 titre provides acceptable sensitivity and specificity in the absence of other diagnostic options and (2) the positive predictive value is higher in a context of high frequency of the disease. The clinical symptoms were compatible with the diagnosis of typhoid fever and did not change during the two phases of the outbreak. Furthermore, if we included patients with other infections in the case control study, this would have led to non-differential misclassification that would not prevent our ability to conclude with respect to the sources of infection identified.

Box 4: Example of a last paragraph of the Discussion

Our study suggests opportunities to prevent typhoid through addressing the sources of infection. These include poor water handling and sanitation practices *{First conclusion point}*, eating unwashed fruit and vegetables *{Second conclusion point}* and eating or drinking locally produced milk products that are not subject to quality assurance *{Third conclusion point}*. To reduce incidence, a number of interventions need to take place *{Transition to recommendations}*. First, we need to advocate for the chlorination of drinking water at home, storage of the treated water in narrow containers and the drawing out of water from containers without contamination by tilting the container or using taps. We also need to encourage the use of latrines at home and the disposal of waste in closed sewerage systems *{First recommendation}*. Second, we need to promote thorough washing or cooking of raw fruit and vegetables *{Second recommendation}*. Third, we need to promote and regulate the adoption of hygienic practices in the preparation and storage of local milk and milk products *{Third recommendation}*. Further studies could characterize the quality of drinking water made available by the public engineering department to the community *{Proposing research addressing the limitation}*. Finally, hospital-based public health surveillance will provide an opportunity to evaluate the effectiveness of the proposed prevention measures *{Proposing methods to monitor / evaluate the impact of the recommendations}*.

Adapted from 'Constructing the argument of a scientific manuscript: A practical guide for trainees in field epidemiology'. June, 2007. <http://www.searo.who.int/PHI>