Reply to Morgan

To the Editor—We appreciate Dr Morgan’s interest in our work [1]. Concerning the use of illness and not infection in our case definition, it is possible that some of the 12 nonconfirmed cases were not due to *Escherichia coli* O104:H4 infection. It is also possible that certain noncases did have undetected subclinical *E. coli* O104:H4 infection. Under the hypothesis that the assignment of cohort members as cases or noncases was not influenced by exposure status, which we believe to be the case, the impact on our study results would be a nondifferential misclassification. Such a misclassification would not induce a spurious association but would tend to bias any association toward the null and thus underestimate an existing association.

Introduction of a systematic bias by focusing on sprouts is also suggested. The 8 initial trawling questionnaires explored the 7 days before symptom onset...
and did not identify sprout consumption. Following information that a German Shiga toxin–producing *E. coli* outbreak strain had an unusually long incubation period, subsequent questionnaires in our investigation were expanded to a 15-day period. This enabled identification of an event common to cases 8 days before symptom onset of the first case. Exact menus and pictures of the foods served during this event were then obtained to construct the cohort questionnaire, which reduced recall bias and explains the higher frequency of sprout consumption in our cohort results.

The fact that multiple food items were associated with illness in univariate analysis could have possibly indicated an infected food handler as the outbreak source [1]. However, considering that after adjustment for all food items in the multivariable analysis, a single food item—sprouts—retains an independent association, this hypothesis seems unlikely. The fact that sprouts were used as garnish and therefore more likely to be eaten in combination with other food items is an alternative explanation for the observed univariate analysis results, sprouts being a confounder.

As with most regression models, our model has limitations, principally the instability of the multivariable model due to collinear variables and the limited number of observations. Collinearity was tested by the multivariable analysis with 1 of 2 collinear covariables (Pearson correlation coefficient >0.9) being dropped from the model. Interactions in our model could not be tested owing to the limited number of observations in the dataset. In our multivariable model with multiple food items, we chose to collate the 3 sprout types into 1 variable, because individual inclusion resulted in instability due to the afore-mentioned limitations. The collated variables “soups” and “dips” were not associated with illness.

We therefore believe that our statement, that this outbreak of Shiga toxin–producing *Escherichia coli* O104:H4 was associated with organic fenugreek sprouts, is correct. In outbreak investigations, causality cannot be proved by finding a single food with an independent association to the illness in a statistical model. Such a result is taken into consideration with descriptive epidemiological evidence and provides a starting point for trace-back and microbiological investigations. European control measures in response to the *E. coli* O104:H4 outbreak were not taken solely on the basis of a French relative risk. They were based on an international body of evidence, namely, descriptive and analytical epidemiological studies and trace-back investigations in Germany and France, and a Europe-wide trace-back and trace-forward study coordinated by the European Food Safety Authority.

**Note**

*Potential conflicts of interest.* All authors: No reported conflicts. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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