

## 1 Executive Summary

**Background:** In June 1999, an outbreak of complaints potentially related to the Coca Cola Company products was first reported in school setting in Belgium, and subsequently in the general population of Belgium and France. No toxic cause being yet established, a mass psychological illness (MSI) was hypothesised.

**Methods:** We performed a case control study in the five schools where the outbreak started. School children were considered as cases if they had had, on the day of the outbreak, at least one of the following complaints: headache, nausea, vomiting, abdominal pain, trembling, dizziness or diarrhoea. Controls were selected among children from the same class, whose names were next on the alphabetical list. The investigation included a face-to-face interview and a review of medical records. Two different production sites supplied soft drinks for Bornem and for the other schools. Analyses were done separately.

**Results:** Between the 8<sup>th</sup> and the 20<sup>th</sup> June, Poisons Call Centres reported over 1000 calls, for which 50% mentioned complaints related to Coca Cola Company products. All cases in the general population occurred after the first outbreak in the school in Bornem on the 8<sup>th</sup> and the 9<sup>th</sup> of June, and after extensive media coverage. In the schools involved, questionnaires of 112 (99 females) cases and 165 (129 females) controls were completed. Headache (62.5%), abdominal pain (56.3%) and nausea were the main complaints.

In the school in Bornem, 34 out the 37 cases and 8 of the 34 controls had consumed at least one Coca-Cola soft drink (OR=36.8, 95%CI 7.6-207.4). Delay between Coca-Cola consumption and occurrence of symptoms ranged from 20 to 1230 minutes (median = 3 hours). Toxicological analysis revealed the presence of hydrogen sulphide that explains the “off “ odour.

In the other schools, 31 out the 75 cases and 22 of the 130 controls had consumed at least one Coca-Cola soft drink (OR=3.5, 95%CI 1.7-7.0). Delay between Coca-Cola consumption and occurrence of symptoms ranged from 0 to 465 minutes (median =2 hours).

**Conclusion:** The outbreak represented a significant public health problem in terms of the number of people affected and resources mobilised. Although it seems reasonable to attribute the first cases in Bornem to Coca-Cola consumption, we cannot prove nor exclude a MSI in the other schools where the outbreak took place after media coverage.

The Coca-Cola consumption hypothesis was supported by a high risk of illness for students exposed to regular Coca-Cola consumption. The strong association with a bad smell, a similar risk for girls and boys, the lack of classical MSI trigger amplifier present or occurring “in line of sight” (the first students came from different classes and did not see each other getting ill) and the lack of other risk factor, i.e. SF36, also supported this hypothesis in Bornem. The MSI hypothesis could be supported by considering the identified gas in the Coca-Cola as a trigger factor and responsible for anxiety, stomach upset, and perhaps other anxiety symptoms. Classical risk factors of MSI were also present. The first outbreak occurred in a school with a high proportion of teenager girls. The context of stress caused by the food security scare following the dioxin crisis, the upcoming elections and end examinations were cumulative risk factors.

**Recommendations:** More co-ordinated toxicological analyses, either on the soft drinks or on the blood samples should have been performed, and the ones performed should have been performed earlier in order to identify more than only residual concentrations of potential toxic substances and should have been performed by neutral laboratories. Criteria for early detection of MSI outbreaks are needed for public health professionals in the community.

A reflection on the involvement and improvement of the application of epidemiological tools as soon as possible in the management of such events should be done. As in many other countries, a central intervention epidemiology unit should receive the initial request to investigate. Intervention epidemiologists are trained to respond and co-ordinate these investigations. The Epidemiology Unit of the Scientific Institute of Public Health has the resources and the capacity to develop this, but lacks the mandate to develop intervention epidemiology. The mandate includes a clear, legally defined, task to tackle crises in public health. This mandate should be issued pro-actively (and not when a crises occurs) and supervised by all the different (public health) authorities. To allow an immediate response, a contact person within each of these authorities should be defined. To allow supervision, a supervisory body should be installed, a role which could be taken by the High Council of Health.