Feeling thirsty?
A pseudo-outbreak with fungal contamination of soft drinks in a hematological isolation unit

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Introduction

- Bottled soft drinks (BSD) are safe and usually pose no health threat for the immunocompromised patient. BSD are consumed by patients with leukemia in particular, when they suffer from severe mucositis
- Microbiological standards based on the EC 98/1983 require BSD to be free of fecal bacteria and turbidity as evidence for microbial growth, however BSD do not have to be sterile
- BSD at the University Hospital Basel fulfill the regulatory requirements for food and drinks, are stored at room temperature - and once opened - discarded, if not consumed the same day
- In July 2015, the bottleneck of an orange-flavoured soft drink used by a patient recently peripheral stem-cell transplanted at the hematological reverse-isolation unit was found to be contaminated with mold-suspicious deposits (Figure 1). Here, we describe the further outbreak investigations to determine the source and the burden of mold contaminated BSD at the University Hospital Basel

Methods

- All bottles delivered to the hematological isolation unit underwent visual inspection and microbiological analysis.
- Swabs of the mold-suspicious deposits from the bottleneck were taken and 50 ml of BSD centrifuged and cultured on blood agar and Sabouraud agar.
- Lot numbers were recorded.
- Electronic patient records as well as all data from routine surveillance were double-checked to identify all patients with possible or probable fungal infection

Figure 1

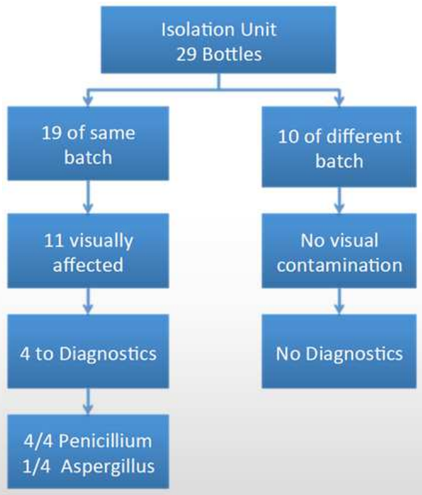
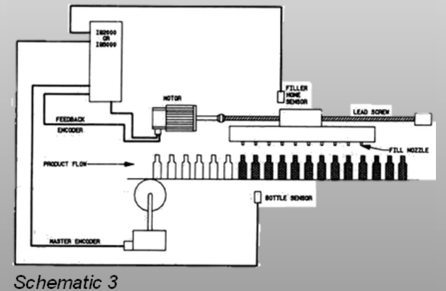


Figure 2



Schematic 3

References:
- Sullivan, K.M., et al., Hematology Am Soc Hematol Educ Program, 2001: p. 392-421.
- Kregiel, D., Biomed Res Int. 2015;2015:128697
- EC 98/1983. Regulation of the European Parliament onWater Directive for Drinking Water

Results

- 29 bottles of the BSD were stored at room temperature at the isolation unit. 19 bottles were from the same batch,10 from a different batch.
- On visual inspection 11 bottles showed evidence for mold contamination by discolouring on the bottleneck (Figure 1). All came from the 19 bottles with the same lot number (58%) and were of orange flavour (Figure 2).
- Fungal culture of the deposits and the fluid was performed from contaminated bottles: All showed growth of *Penicillium* sp. and 25% *Aspergillus fumigatus* on the bottleneck as well as in the fluid.
- We examined additional 33 bottles from different lot-numbers and different units. 16 of these were examined by fungal culture. Only 1 showed growth of *Penicillium* sp. in the fluid.
- A temporary faulty mechanism in the filling process that led to spill over the top of the bottle without consecutive cleaning of the liquid deposits on the bottleneck was identified as the most likely cause of the contamination (Schematic 3).
- Distribution of BSD from the affected manufacturer was ceased immediately and our Institution decided to switch to another manufacturer.
- One immunocompromised patient at the haematological isolation unit had drunken from the contaminated BSD and was put under antifungal prophylaxis with voriconazole. Intensived surveillance did not show evidence of fungal infections possibly associated with BSD.

Conclusions

- **BSD may be contaminated with mold even if they are properly stored and are within shelf-live**
- **Current legislation allows for fungal spores in BSD, but may pose a health risk to patients with haematological malignancies**
- **Healthcare workers should be trained to perform visual checks before delivering BSD to patients**
- **Hospitals should review their infection control guidelines or the severely immunocompromised and adjust their recommendations**