Author's response to reviews

Title: Gastro-enteritis outbreak among Nordic patients with psoriasis in a health centre in Gran Canaria, Spain: a cohort study

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Author's response to reviews: see over
Outbreak of *Pseudomonas aeruginosa* infection due to contaminated mouth swabs, Norway 2001-2002.

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**Background**
During the winter 2001-2002, we investigated an increase in the number of *Pseudomonas aeruginosa* (Pa) infections in several hospitals in Norway.

**Methods**
Environmental and microbiological investigation: Following interview of patients, moist products were suspected and sampled. Pa was found in one product. We recalled the product and inspected and sampled at the production site. We genotyped environmental and clinical Pa strains.

Epidemiological investigation: For a case control study cases and controls were persons with the outbreak strain (Pa-x) or another Pa strain (Pa-n), respectively, isolated from blood or CSF in the period September 2001-June 2002. We searched for cases and controls by unthawing and genotyping all routinely frozen Pa strains from the period from all laboratories in the country.

**Results**
A genotypically identical Pa strain (Pa-x) was identified in 76 moist mouth swabs called Dent-O-Sept produced between week 38-2001 and week 15-2002, from the production line, and from patients. We found 39 cases and 159 controls. Use of Dent-O-Sept was associated with Pa-x infection (compared to Pa-n infection) (OR 7.9 [95% CI 3.2–19]), as was ventilator treatment (OR 7.8 [3.5–18]), intensive care (OR 3.7 [1.7–7.9]), and surgery (OR 2.3 [1.1–4.7]). Attributable fraction among those exposed to Dent-O-sept was 87%. Pa-x was also identified from other anatomical sites in 192 other patients, for a total of 231. Of these, 71 (31%) died; 23 (10%) of whom had Pa-x infection as the reported cause of death.

**Conclusions**
The epidemiological investigation and the finding of the same PA strain in the production line, the product and the patients supported the conclusion that contaminated mouth-hygiene-swab were the source of the outbreak. The product was recalled and the production terminated.

**Conclusions**
Pseudomonas aeruginosa from tap water contaminated a mouth-hygiene-swab during its production. At least 231 patients were infected and 23 died as a result. The epidemiological investigation, the finding of the same strain in the production line, the product and the patients supported the conclusion. The product was recalled and the production terminated.

**Key words:** Pseudomonas aeruginosa, outbreaks, Norway, equipment and supplies, hospital