

LETTER TO THE EDITOR

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Prediction of asthma hazard of glutaraldehyde substitutes

Dear Sir,

Franchi and Franco [1] presented a thorough evidence-based evaluation of respiratory symptoms in a nurse exposed to the new disinfectant, *ortho*-phthalaldehyde (OPA) in their recent case report. Using the British Occupational Health Research Foundation guidelines they initially estimated a high clinical suspicion index for occupational asthma (OA) in this case. One item of evidence that they cited for this was the risk factor statement 'Aldehydes are documented as common causative agents of OA'. However, their literature search did not reveal conclusive evidence that OPA specifically could cause OA.

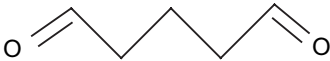

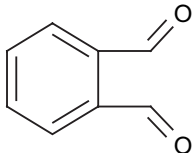
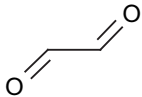
We have been developing and validating a method for identifying and corroborating novel chemical causes of OA reported to The Health and Occupation Reporting (THOR) network based at the University of Manchester. It utilizes a quantitative structure activity relationship

model [2], which is freely available on the Internet through the following website: <http://www.medicine.manchester.ac.uk/coeh/research/humanhealth/asthma>

When a chemical structure is entered into this Asthma Hazard Assessment Program, a hazard index between zero and one is generated indicating the likelihood that the chemical is asthmagenic. External validation of the program has shown that a cut-off hazard index of 0.5 predicts asthmagenicity with a sensitivity of 86% and specificity of 99%.

Table 1 shows alternatives to glutaraldehyde which have been used as disinfectants in the health care sector, and which are also aldehydes. It illustrates that all four of these dialdehydes have a common structural basis for asthmagenicity. A possible mechanism is that each of the aldehyde groups in the molecule could react with an amine group of a native human protein resulting in its cross-linking and rendering it immunogenic. For OPA, there has also been one case of OA reported to THOR. While the second stage of Franchi and Franco's evidence-based decision making process concluded that their worker's symptoms were characterized as an irritant

Table 1. THOR data for aldehydes that have been used as glutaraldehyde substitutes

Chemical and CAS No.	Trade names	Structure and asthma hazard index	Cases reported to THOR (SWORD & OPRA) 2002–4
Glutaraldehyde 111-30-8	CIDEX, TOTACIDE, ASEP	 0.82	18
Succinaldehyde 638-37-8	GIGASEPT	 0.78	0
OPA 643-79-8	CIDEX OPA	 0.73	1
Ethanedial 107-22-2	GLYOXAL	 0.66	0

CAS, Chemical Abstracts Service; OPRA, Occupational Physicians Reporting Activity; SWORD, Surveillance of Work-related and Occupational Respiratory Disease.

airway syndrome not aggravated at work, our data raise the suspicion that OPA is a respiratory sensitizer.

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References

1. Franchi A, Francho G. Case Report: evidence-based decision making in an endoscopy nurse with respiratory symptoms exposed to the new *ortho*-phthalaldehyde disinfectant. *Occup Med (Lond)* 2005;**55**:575–578.
2. Jarvis J, Seed MJ, Elton RA, Sawyer L, Agius RM. Relationship between chemical structure and the occupational asthma hazard of low molecular weight organic compounds. *Occup Environ Med* 2005;**62**:243–250.