



Concept 10 February 2020

**ENVIRONMENTAL CONTAMINATION WITH CYTOSTATIC
DRUGS AT THE CHEMOTHERAPY DEPARTMENT**

**GENESIS CARE
WEST MALLING – UNITED KINGDOM**

16 January 2020

Aim of the study

Environmental contamination with docetaxel, 5-fluorouracil, and paclitaxel was measured at the Chemotherapy department of Genesis Care hospital in West Malling. Wipe samples were taken from five surfaces and a pair of gloves.

Materials and methods

16 January 2020, wipe samples were taken and gloves were collected under responsibility of Penny Hickey.

Wipe samples were taken from five surfaces at the Chemotherapy department. In addition, a pair of gloves was collected. An overview of the surfaces and gloves is presented in Table 1. The dimensions of the surfaces and gloves were determined and the areas were calculated. The wipe samples were taken with Cyto Wipe Kits from Exposure Control Sweden AB [1]. The gloves were collected in a container.

All samples were stored at 4°C after sampling and at room temperature during transport. Upon arriving at the lab, the samples were stored frozen until sample preparation and analysis.

The wipe samples and the gloves were prepared for analysis by adding a 0.1% formic acid solution. Total extraction volume was 100 ml. After extraction, a part of the extract was further cleaned up for analysis.

Docetaxel, 5-fluorouracil, and paclitaxel were analysed with LC-MSMS [2].

Results

The results of the analysis of the wipe samples and gloves are presented in Table 1. The contamination per cm² is calculated assuming 100% recovery and wipe efficiency. This means that all results are underestimates. Contamination per cm² is presented according to the colour indication related to the Alert and Action levels for environmental contamination in The Netherlands (Table 2) [3]. The detection limit for the analysis of docetaxel, 5-fluorouracil and paclitaxel is 0.2 ng/ml extract.

The results show contamination with 5-fluorouracil on the pharmacy workstation and on the gloves handled 5-fluorouracil (Table 1). Contamination with paclitaxel and docetaxel was not found.

Table 1: Paclitaxel (PAC), 5-fluorouracil (5FU), and docetaxel (DOC) in wipe samples and on gloves from the Chemotherapy department

Sample Code	Description Surface	Surface Area (cm ²)	Total Volume (ml)	PAC (ng/cm ²)	5FU (ng/cm ²)	DOC (ng/cm ²)
1	Nurse station	5000	100	ND (<0.004)	ND (<0.004)	ND (<0.004)
2	Chemo pod keyboard	3000	100	ND (<0.007)	ND (<0.007)	ND (<0.007)
3	Pharmacy workstation	5000	100	ND (<0.004)	0.01	ND (<0.004)
4	Treatment room workstation	5000	100	ND (<0.004)	ND (<0.004)	ND (<0.004)
5	Dispensary keyboard	3000	100	ND (<0.007)	ND (<0.007)	ND (<0.007)
6	Gloves handled 5FU	3000	100	ND (<0.007)	0.07	ND (<0.007)

ND: Not Detected

Table 2: Alert and action levels for environmental contamination with cytostatic drugs in The Netherlands [3]

Contamination (ng/cm ²)	< 0.10	0.10 – 1.0	1.0 – 10	> 10
Actions	Repeat annually	Alert level: Perform risk assessment Repeat wipe tests after 3 – 6 months If necessary, take extra precautions		Action level: Take extra measures and check with repeat wipe tests

Discussion, Conclusions and Recommendations

The results show no spread of contamination and the observed contamination with 5-fluorouracil on the pharmacy workstation and on the gloves is very low.

Compared to the Alert and Action levels for environmental contamination in The Netherlands (Table 2), the results show no contamination (indicated in green).

Although the contamination with 5-fluorouracil on the pharmacy workstation and on the gloves is very low, it does show release of the drugs during handling. Contamination on the gloves supports the need of wearing gloves to protect the workers from being exposed by skin contact resulting in uptake of the drugs.

It is recommended to validate the handling activities and cleaning to reduce contamination on the gloves and on the pharmacy workstation. Effective cleaning could work as well.

References

- 1 www.exposurecontrol.net
- 2 Exposure Control Sweden AB. LC-MSMS methods for the analysis of cytotoxic drugs in air, wipe and urine samples.
- 3 Meetstrategie en werkinstructie veegproeven cytostatica. Werkgroep toetsingswaarden cytostatica. November 2016. www.dokterhoe.nl

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