

Evaluation of chemical contamination of surfaces during the preparation of chemotherapies in 24 hospital pharmacies

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Abstract

Purpose: To evaluate the chemical contamination of surfaces by cytotoxic agents during preparation of injectable chemotherapies in hospital pharmacies.

Methods: 526 wipe samples collected in 24 Swiss hospital pharmacies were analyzed using a validated liquid chromatography–mass spectrometry/mass spectrometry (LC-MS/MS) method able to quantify 10 cytotoxic agents: cytarabine, gemcitabine, cyclophosphamide, ifosfamide, methotrexate, etoposide phosphate, irinotecan, doxorubicin, epirubicin and vincristine. Information on chemotherapies produced and equipment and production processes used were collected from all the hospital pharmacies on a voluntary basis in order to investigate their association with contamination rates.

Results: In two pharmacies, no contamination of surfaces by cytotoxic agents was detected. Chemical contamination was detected in the other 22 hospital pharmacies, with combined total contamination of the 10 cytotoxic agents ranging from 8 ng to more than 41,000 ng per sample. Most contaminated samples came from inside biosafety cabinets, but some came from other cleanroom areas and logistics rooms. Statistically significant associations were observed between contamination rates and sampling locations, the number of chemotherapies prepared per year and types of cleaning solutions used.

Conclusion: This study demonstrated that most of the hospital pharmacies tested had some contamination of surfaces by different cytotoxic agents. Even if highest levels of contamination were mainly detected inside biosafety cabinets, technicians were also exposed to cytotoxic agents detected in logistical and storage areas. Protective measures should therefore be maintained or even reinforced in these areas in order to limit technicians' risks of exposure when handling cytotoxic products.