

# SURFACE CONTAMINATION WITH CYTOTOXIC DRUGS IN EUROPEAN HOSPITAL WARDS

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## BACKGROUND

Several studies have shown that antineoplastic drug contamination is found on various work surfaces in hospitals and varies widely in the wards. The MASHA project (Research about Environmental Contamination by Cytotoxics and Management of Safe Handling Procedures) was set up to conduct new research, in cooperation with ESMO (European Society for Medical Oncology), into contamination levels in hospital wards.

## AIM

- ✓ To obtain an overview of the current levels of cytotoxic contamination in the workplace in European hospitals
- ✓ To increase awareness among healthcare workers and their employers of the risks associated with handling hazardous drugs and to provide them with measures for protecting their health
- ✓ To develop additional steps and programs to improve working conditions and quality control procedures as a way of protecting healthcare workers from the adverse effects associated with occupational exposure to anti-neoplastic drugs

## MATERIALS AND METHODS

The assessment of surface contamination with cytotoxic drugs was done by evaluating wipe samples collected from 4 comparable surfaces on the wards (work benches, floors, armrest of patient's chairs and lids of waste containers). Each sample was analysed for the presence of 5 commonly used cytotoxic drugs: cyclophosphamide (CP), 5-fluorouracil (5-FU), paclitaxel (Pac), gemcitabine (Gem) and total platinum (Pt) for platinum drugs, using ICP-MS for total platinum and LC-MS/MS for other substances.

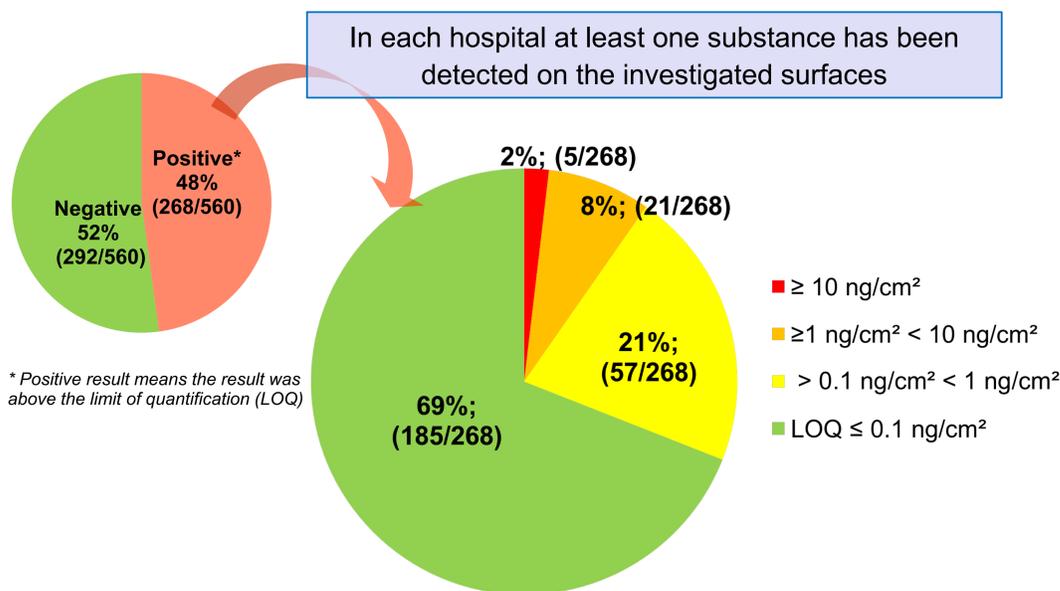


Fig 1. Analysis results for all substances in 28 hospitals and percentage of positive results in different range

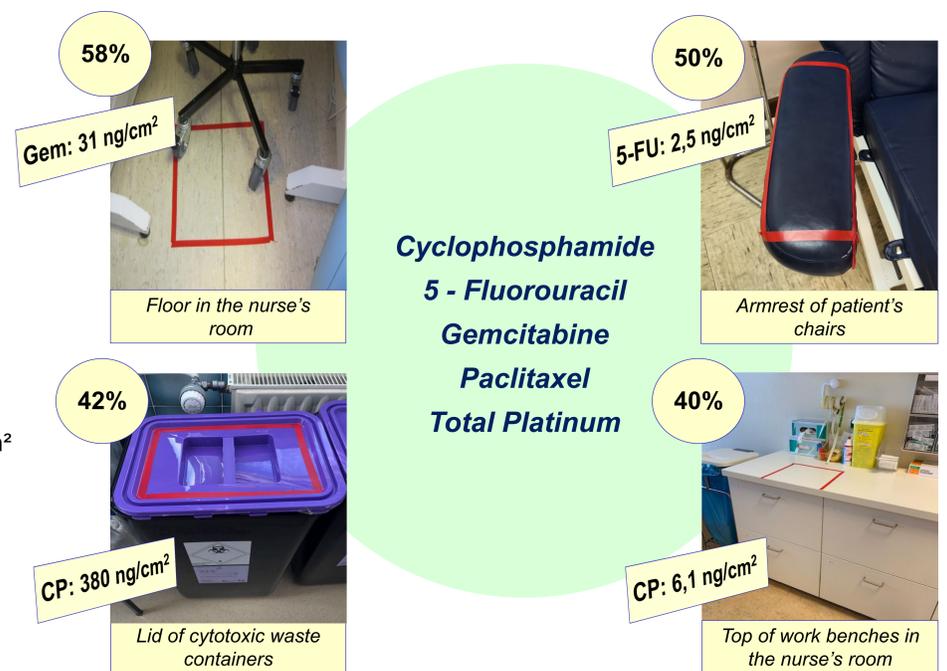


Fig 2. Percentages of positive samples with the highest concentration of analyzed substances on investigated surfaces in 28 hospital units

## RESULTS

The database includes results collected from 28 hospital units from 16 European countries. Of the 560 samples collected, 268 were positive (48%) (Fig 1.). Measurable amounts of at least one substance were detected on investigated surfaces in every hospital. 21/28 (75%) hospitals had over 30% positive samples. Contamination was detected mostly on the floors (58%), armrests (50%), lids (42%) and work benches (40%). The highest values were noticed for CP (380 ng/cm<sup>2</sup>) and 5-FU (130 ng/cm<sup>2</sup>) on the lids (Fig 2.). The highest number of positive results were recorded with Pt (33%), 5-FU (25%), Gem (19%) and CP (18%) (Fig 3.). Substances were detected on 45/112 of surfaces (40%) which had NOT been used for cytotoxic drug preparation on the day of wipe sampling.

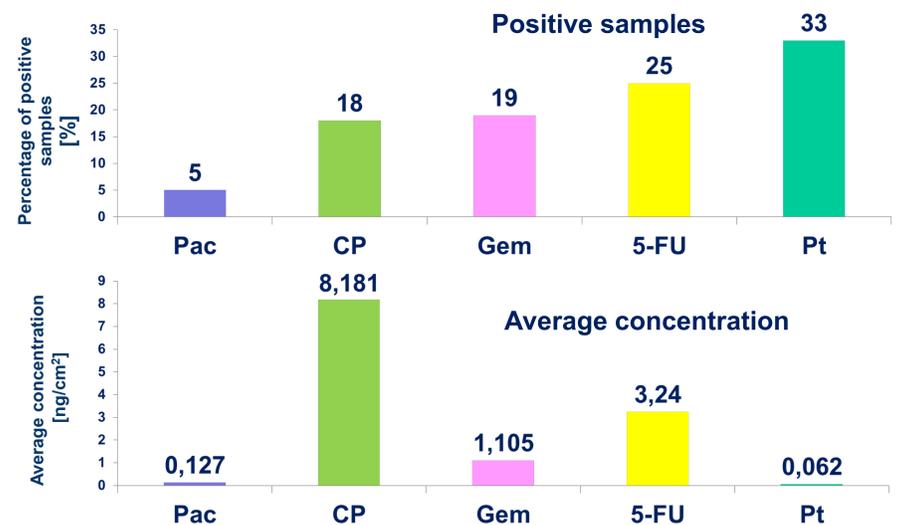


Fig 3. Percentages of positive samples and average concentration of cytotoxic substances on investigated surfaces in 28 hospitals.

## CONCLUSION

Contamination is detectable on the ward but at different levels in different hospitals. Cleaning procedures are still not effective. Therefore, evaluation of healthcare workers exposure is crucial. Greater collaboration with medical and nurse societies, to improve safe handling procedures in hospitals and thus improve the safety of all healthcare workers, is required.