# Decontamination of general medical ward facilities with UV-C during construction in Royal Lancaster Infirmary

Vanda Plecko [1], Monika Pasztor [2], Peter Burkhart [2]

[1] Microbiology Department, Raigmore Hospital, NHS Highland, Inverness, UK

[2] Microbiology Department, University Hospitals of Morecambe Bay, NHS Trust, Lancaster, UK

## OBJECTIVES

Outbreaks of invasive aspergillosis have been connected with ongoing building works in hospitals. Moreover, during construction there is possibility to have increase in the numbers of the other opportunistic microorganisms beseides Aspergillus. Reduction of overall bioburden in the patient environment and on patient equipment is linked with reducing the risks for hospital aquired infections.

Ultra-V system (Inivos) utilises UV-C rays to rapidly inactivate DNA with no ventilation restrictions or vapour-impermeable requirements.

## AIM

Aim of this project was to evaluate indicative "snapshot" of environmental and air contamination before and after UV-C decontamination during ongoing construction on a general medical ward in Royal Lancaster Infirmary, Lancaster, UK.

## MATERIAL AND METHODS

The resources used were:

- Ultra-V decontamination system,
- Rodac agar plates-Pro-Tect TWI (contact plates) – Product Code PO0678D
- Air samples Merck
- Sterile Gloves

Testing was carried in total of 13 rooms (dirty utility room, clean utility room, storage room, 8 en suite bathrooms, 2 public toilets). Touch plate samples and swabs were taken on following locations before and after UV decontamination.

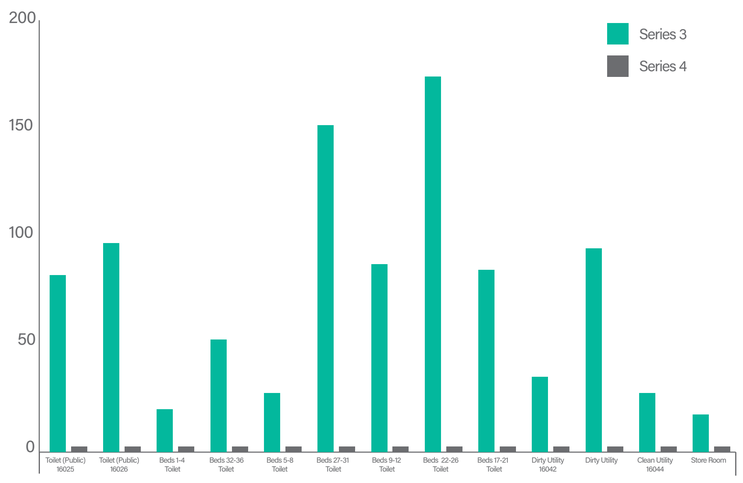
- Clean utility had samples bin lid, sink, sideboard, stat strip maschine and cupboard handle,
- Dirty utility had samples from sideboard, sink, macerator, shelf and bin lid.
- Storage room had samples from shelf, table, ladders, rack and drawers.
- In bathrooms/toilets bin lid, sink, handrail, paper towel holder and toilet roll holder were sampled.

Process times for UV decontamination: toilet (average) 4 min 20s, dirty utility (average) 5 min 30s, clean utility 9 min 46s, store room 5 min 21s.

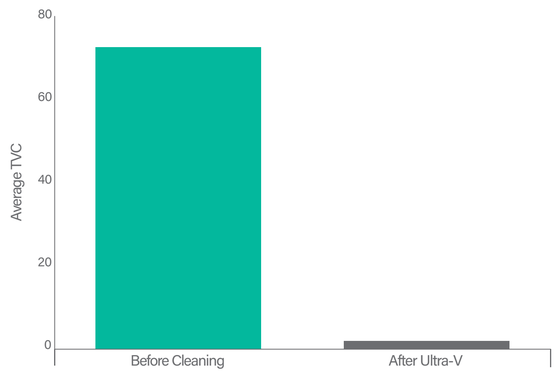
Testing included total viable count (TVC) sampling before and after UV decontamination and air sampling before, immediately after (8-20h) and week after UV decontamination.

## ENVIRONMENTAL SAMPLING RESULTS

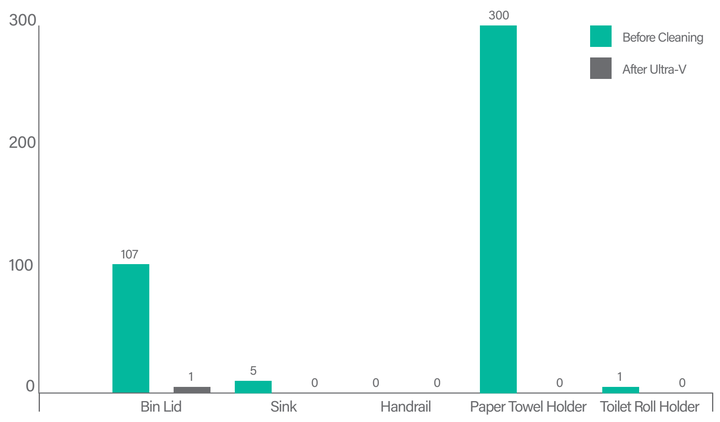
### Average TVC by Location



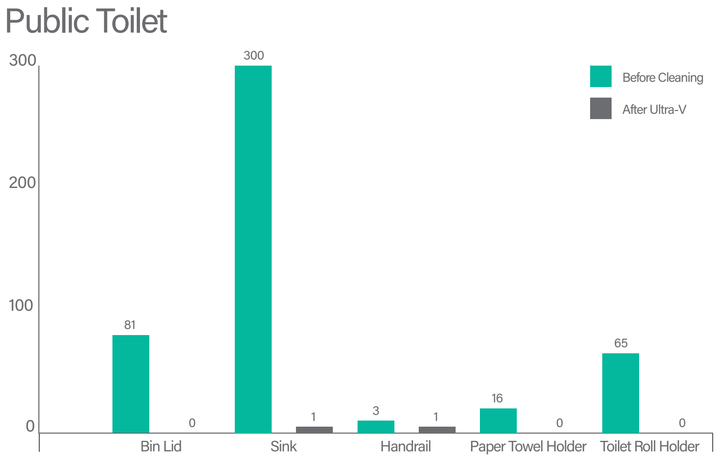

### Average TVC Overview



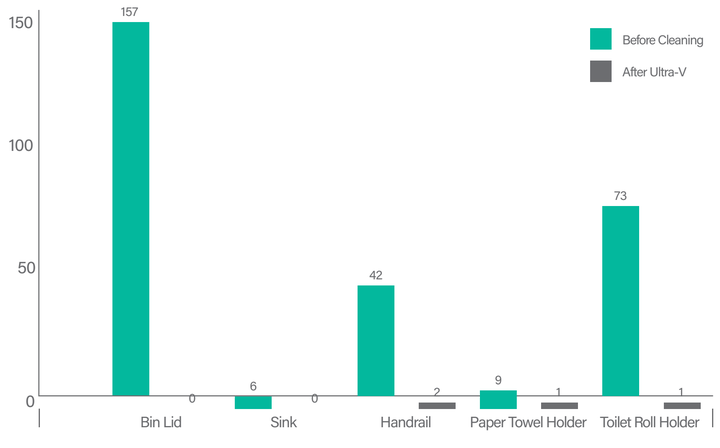

### Public Toilet



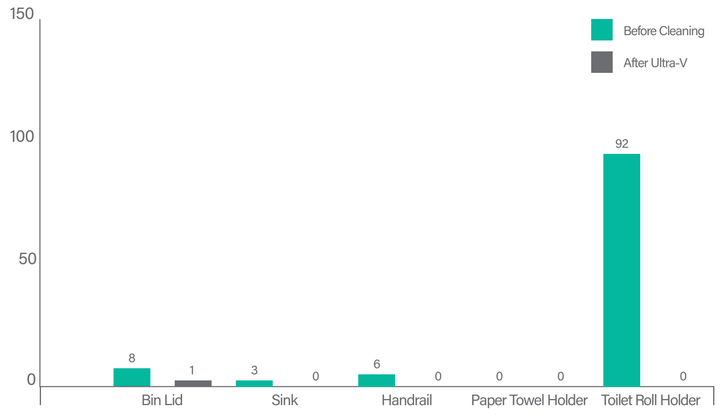

### Public Toilet



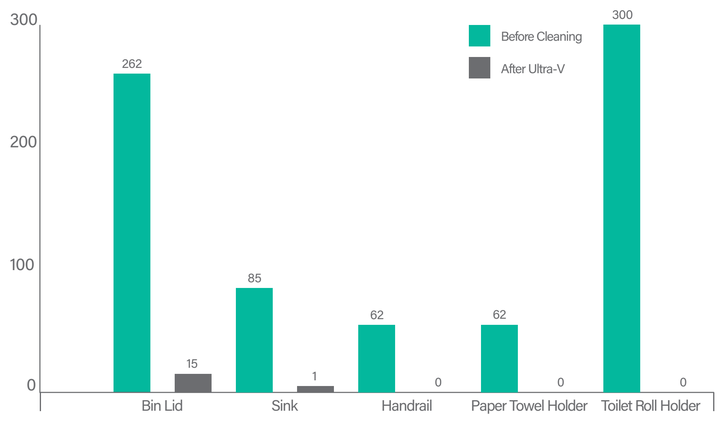

### Beds 32-36 Toilet




### Beds 1-4 Toilet




### Beds 27-31 Toilet




### Air fungal counts

| Site | Before UV species, no conidia/m3 | Before UV conidia/m3 | Before UV bacteria | After UV* species | After UV* conidia/m3 | After UV* bacteria |
|---|---|---|---|---|---|---|
| Background outside | Penicillium sp, 28<br>Asp. fumigatus, 4<br>Acremonium, 20 | 52 | 1108 | Penicillium sp. 12<br>Acremonium sp. 4<br>Asp. fumigatus, 8 | 24 | 420 |
| Public toilet 1 | Penicillus sp, 24<br>Acremonium, 4<br>Scedosporium, 4 | 32 | 464 | Penicillium sp. 4<br>Acremonium sp. 4 | 8 | 516 |
| Public toilet 2 | Penicillium sp, 12<br>Acremonium sp.4 | 16 | 340 | Environmental fungus, 4<br>Asp. fumigatus, 12<br>Penicillium sp., 8 | 24 | 784 |
| Bay 32-36, toilet | Penicillium sp, 8<br>Environmental fungi,24 | 26 | 1008 | Aspergilus spp, 8 | 8 | 192 |
| Bay 1-4, toilet | Penicillium sp, 56 | 56 | 128 | Asp. fumigatus, 4<br>Acremonium sp 4 | 8 | 100 |

*7 days after

- TVC showed reduction from 73.3. to 1.7 which was obtained after decontamination
- The highest levels were recorded for tilet roll holders, bin lids and sinks
- Air samples showed highly variable numbers of different moulds with dominating Penicillium sp and other opportunistic moulds with evidence of reduction following decontamination

## CONCLUSION

- UV-C decontamination achieved a significant level of reduction of microorganisms detected on the surfaces without requirement for vapour-impermeable sealing
- High levels of microorganisms have been detected which showed limitations of manual cleaning in shared facilities