

# Screening and Cleaning

## How University Hospital of South Manchester reduced the number of in-patients being identified with CPE.

Jay Turner-Gardner<sup>a</sup>, Dr Stephanie Thomas<sup>b</sup>, Joanne Nolan<sup>c</sup>.

<sup>a</sup> Head of Nursing – Infection Prevention & Tissue Viability, University Hospital of South Manchester NHS Foundation Trust.  
<sup>b</sup> Consultant Microbiologist for Decontamination, University Hospital of South Manchester NHS Foundation Trust.  
<sup>c</sup> Audit & Surveillance Officer, University Hospital of South Manchester NHS Foundation Trust.

### SECTION 1 – BACKGROUND

The University Hospital of South Manchester NHS Foundation Trust first identified cases of Carbapenemase-producing Enterobacteriaceae (CPE) in 2009. Following increased surveillance activities, the Infection Prevention Team became aware that the incidence of CPE in their cohort of patients was steadily rising. In recognition that hospitals were seeing an increasing number of cases of CPE, Public Health England (PHE) published the Acute Trust Toolkit for the early detection, management and control of CPE in 2013. The toolkit's recommendations focused on identifying and isolating patients on admission, to avoid the spread of CPE to other patients. The challenge for UHSM was that the incidence of CPE was such that the suggested preventative measures, e.g. quarantining, patients, had become impractical with regards to patient flow and continuing of ongoing care. It was at this point that UHSM began to focus on and explore other ways in which they could control the spread and prevent further occurrences thus avoiding the risk of a CPE outbreak.

In response to promoting patients safety the Infection Prevention Team introduced several new initiatives throughout the Trust at this time, one of which was the introduction of a hydrogen peroxide vapour (HPV) system to decontaminate the patient environment to a higher level than their usual 'terminal clean', a 'terminal clean' was the usual protocol following the discharge of patient with a known or suspected infection. Initially this enhanced cleaning was being used on a reactive basis via an 'on-call' service. However, in response to the publication of the 'Acute Trust tool kit' the Trust proposed a CPE screening programme for all emergency and elective patients and also the introduction of a Managed ProXcide service to look at proactive decontamination as well as re-active decontamination of the patients environment to control the spread of CPE to other patients. It was decided to evaluate the effectiveness of the new screening programme combined with a proactive managed decontamination service, using HPV systems.

### SECTION 2 – SCREENING METHODS

Screening was carried out in the following steps:

#### Emergency and Elective screening:

1. Patients who were admitted to the hospital and due to stay for 23+ hours who had a previous hospital admission within 12 months were screened within 48 hours of admission. Any patient who had had a previous hospital admission, here or overseas within the last 12 months who's present stay in hospital was expected to be more than 23 hrs.
2. All previously positive patients were classified as still having CPE colonisation.

#### Surveillance screening:

3. Once a patient was identified as being colonised/Infected with CPE, they would be nursed in a single room and other patients in the bay would be screened.
4. If patients in surrounding bays or rooms were identified as being colonised with CPE, the whole ward would be screened. If there were more patients identified being colonised with CPE a meeting would be instigated and discussions regarding cause discussed.

#### Outbreak screening:

5. All Patients admitted to an outbreak ward were screened on admission and subsequently screened on a weekly basis whilst they remained negative.
6. Once there were no new acquisitions of CPE colonisation for 4 weeks the outbreak would be declared over.
7. The ward continued to screen all negative patients whilst patients colonised with CPE remained on the ward to ascertain cross colonisation.
8. The ProXcide HPV systems would be applied to decontaminate the environment following discharge /Transfer of every patient known to be colonised/Infected with CPE.
9. CPE prevalence over time was plotted against HPV decontamination efforts to evaluate the strength of correlation and thereof the apparent effectiveness of HPV in controlling the spread of CPE.

### SECTION 3 – RESULTS

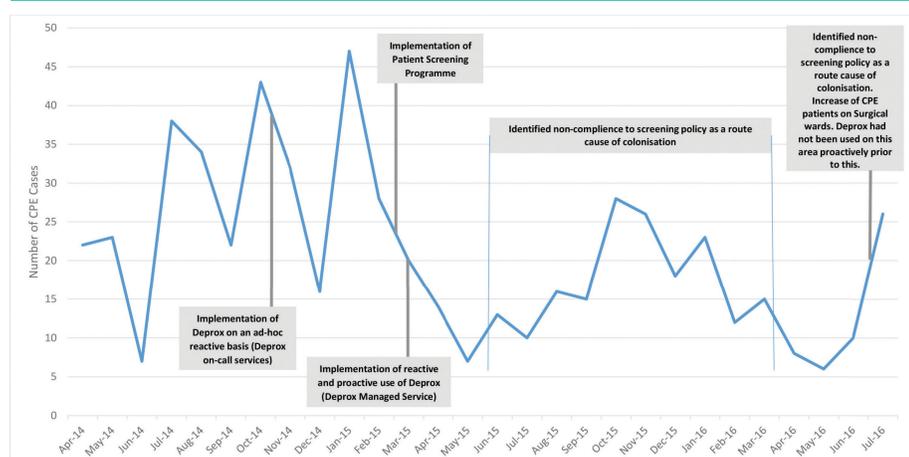


Figure 1 shows the number of CPE patients over time, utilising a break-point model to illustrate the implementation of new initiatives during this time period.

### SECTION 4 – DISCUSSION

Since the patient screening programme and the HPV decontamination program was introduced the hospital's CPE rates have fallen 58%. Hospital figures reveal that CPE acquisition within the hospital has been almost completely eradicated, with CPE cases being present mostly in newly admitted patients.

The HPV system proved highly effective right from the onset, with CPE levels falling consistently from late January to the end of April, being reduced from 47 to only 7. Despite a spike in the level of CPE patients between May and December 2015 resulting from several Outbreaks, 27 out-of-hours processes during this time were effective in controlling this trend such that the increase in CPE incidence at any one time was less than half of the increases experienced in 2014 and early 2015, and average CPE patient levels were observed to continually decrease despite short-term increases.

Managed ProXcide services also proved highly effective in controlling outbreaks of CPE, with outbreaks identified in 2014 and early 2015 (before the implementation of a managed service) typically lasting for 6 months, compared with a shortest resolution time of 27 days through managed decontamination.

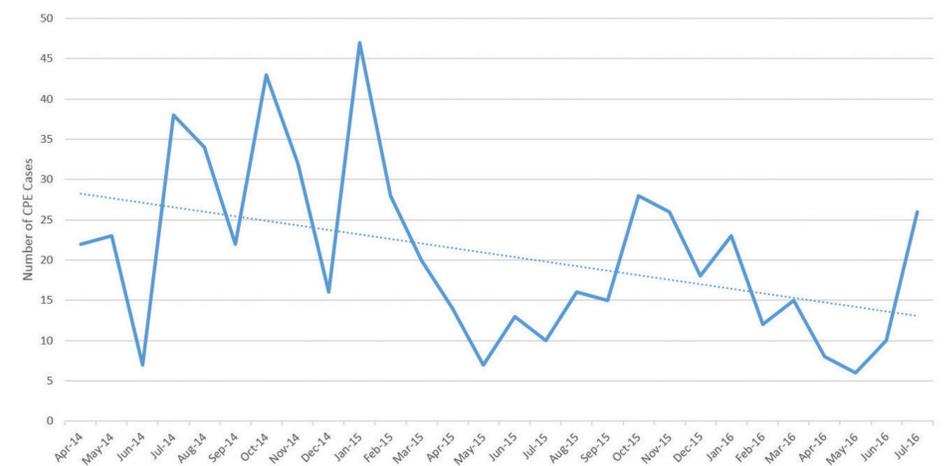


Figure 2 shows the number of CPE patients over time

### SECTION 5 – CONCLUSION

Results attained by the hospital would suggest that the reduction of transmission of CPE to very low levels is possible through appropriate vigilance and rapid response to the identification of possible CPE colonised patients and their effective management both during admission and following discharge to minimise infection risks to themselves and others. The findings also suggest that HPV is highly effective as a decontamination mechanism within clinical settings with regards to preventing cases of CPE.

It has been noted that improvements in overall cleanliness have positively impacted on the spread of other infections within the hospital, most notably with cases of *Clostridium difficile* decreasing in line with HPV decontamination. This requires further investigation and analysis in order to quantify the exact link between the reduction in C.Dificile and the use of HPV systems.

It has also been observed that the use of HPV systems has had a psychological impact on hospital staff, with carers being reminded of the importance of hygiene and subsequently maintaining stricter cleaning practices. This should be noted as a further contributing factor in the reduction of CPE cases at the hospital.

### SECTION 6 – FURTHER WORK

There is scope to continually improve and look at ways of optimising the initiatives implemented over the past 18 months. An example of this would be to look at decontaminating more patient environments in areas of high throughput where HPV is a challenge to deploy operationally. This could potentially lead to the implementation of UV-C light for environmental decontamination within the hospital.

